MODERN GEOGRAPHY SERIES

---

## BOOK VI

# THE
# SOUTHERN CONTINENTS

BY

A. W. COYSH, M.Sc.
FORMERLY GEOGRAPHY AND SIXTH FORM MASTER
YARDLEY GRAMMAR SCHOOL, BIRMINGHAM

AND

M. E. TOMLINSON, D.Sc., Ph.D.
FORMERLY SENIOR MISTRESS
YARDLEY GRAMMAR SCHOOL, BIRMINGHAM

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# PREFACE

*The Southern Continents* is the sixth of a series of seven books, issued under the general title "Modern Geography", and has been written primarily to meet the needs of pupils preparing for the General Certificate of Education at the Ordinary Level, and for other examinations of similar standard.

In the case of each continent the more general features of its geography are treated first, as a whole, and this is followed in subsequent chapters by emphasis on the regional aspects. An attempt has been made throughout to keep a balance between physical, human, and economic considerations.

As in the other volumes, the numerous maps and pictures should prove to be a valuable and attractive feature of the book; many of them will provide material for discussion. We are greatly indebted to all those who have provided photographs; due acknowledgment is made below each illustration.

# NOTE TO THE EIGHTH EDITION

For this edition the text has been revised and the latest economic statistics and population data have been included. Temperature figures are shown in degrees Centigrade with the corresponding Fahrenheit figures in italics.

A. W. C.
M. E. T.

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# THE SOUTHERN CONTINENTS

## CHAPTER I

## AFRICA: GENERAL

Africa is the largest of the southern continents. It lies between the Atlantic and Indian Oceans and extends almost equal distances north and south of the Equator. Until the cutting of the Suez Canal in 1869, Africa was a serious barrier to trade between Europe and the Far East.

### Surface Features

The greater part of Africa consists of a plateau composed of ancient rocks. In its age and types of rock, the African Plateau resembles the Brazilian and Guiana Highlands of South America, and the Western Plateau of Australia. Like them, it is also very rich in minerals. The only important systems of folded mountains in Africa lie in the extreme north-west, and in the south. In the north-west are the ranges of the Atlas Mountains which belong to the Alpine mountain system of Southern Europe. They originated during the last great mountain-building period when the Alps, Himalayas, and Andes, also came into being. Folded mountains of greater antiquity than the Atlas Mountains form east-west trending ranges in the south of Cape Province, where they are ruckled up against the southern edge of the plateau to form the Swartbergen and Lange Bergen Mountains.

The African Plateau occupies most of the continent south of latitude 5° S. Northward it splits into three main stretches of high land—(*a*) the hills flanking the Guinea coast and the Futa Jallon Plateau; (*b*) the Tibesti and Ahaggar Mountains of the Sahara; (*c*) the high land which runs parallel to the Red Sea coasts on both the African and the Arabian sides. The general level of the plateau south of the Equator is from 2,000 ft to 4,000 ft, but there are marked variations in height. Its surface is pitted by several extensive basins (Fig. 1) which sink below the average level. There are also higher areas such as the Drakensberg Mountains—where the rim of the plateau forms a bold escarpment—and the volcanic mountains of East Africa, Cameroon, and Ethiopia. The eastern part of the plateau is dissected by a remarkable system of rift valleys (Fig. 1) which form long, deep trenches flanked by steep escarpments and sometimes by high volcanic cones such as

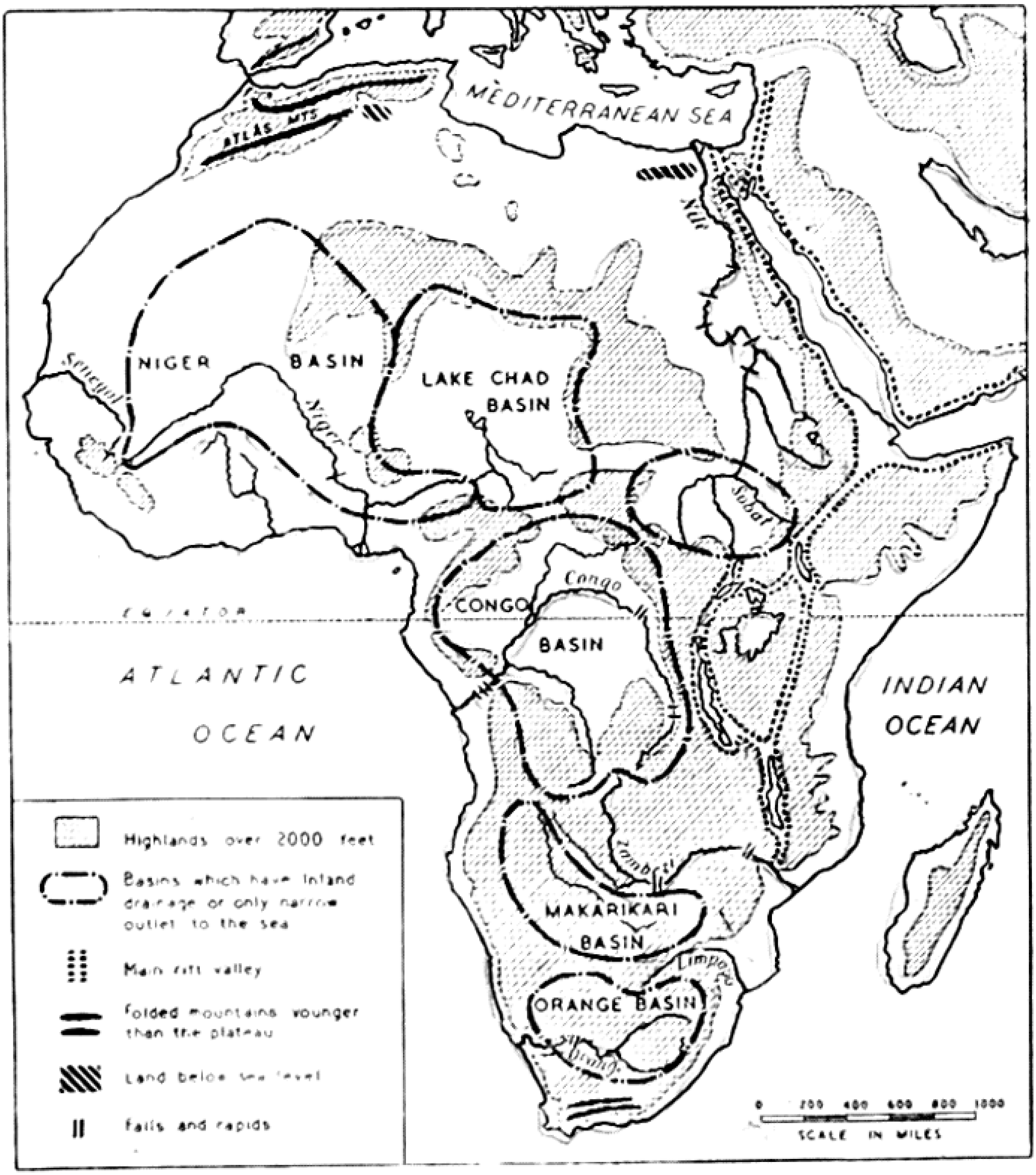


Fig. 1. AFRICA: RELIEF AND DRAINAGE.

Kilimanjaro (19,320 ft), Mt Kenya (17,040 ft), and Mt Elgon (14,176 ft)—all in East Africa. Active volcanic cones occur near the western rift valley. The floors of the rifts are uneven and long, deep lakes such as L. Albert, L. Tanganyika, L. Malawi, and L. Rudolf occupy depressions in them. The northern end of the African Rift Valley system is continued by the Red Sea and the Gulf of Aden.

The largest lake in Africa is Lake Victoria, but this is not a rift valley lake. It occupies a relatively shallow depression in the plateau and is roughly square in shape. Lowlands are rare in Africa; no continent has such a small proportion of land below 600 ft above sea level. Instead of extensive coastal plains the edge of the plateau forms an escarpment very near to the coast.

### Rivers and Drainage

About one-third of Africa has no direct drainage to the sea. Formerly there was an even greater area of interior drainage, when little, if any, water passed out from the basins shown on Fig. 1. However, in course of time, short active streams which drained the wetter seaward rim of the plateau cut back and captured the drainage of some of the inland basins. This has happened in the case of the Niger and the Congo where the rivers flow through basins in their upper and middle courses but escape to the sea through narrow gaps in the plateau rim. In many areas capture of inland waters is still proceeding. More and more water is being diverted to the Niger from the Lake Chad Basin by way of the River Benue, and from the Makarikari Basin to the Zambezi. The amount of water in the basin lakes is thus decreasing and it is probable that this is resulting in a lower rainfall in Africa, and is extending her arid areas.

All the African rivers are characterised by waterfalls and rapids. Those formed where they cut through the plateau rim near their mouths prevent navigation from the coast inland. Beyond these obstructions there are often many miles of navigable waterway extending into the interior of the continent, although further rapids may impede navigation (on the River Congo, for example). The mouths of African rivers seldom afford good harbours. Either the river enters the sea by a maze of small streams, such as those of the Niger delta, or the mouth is obstructed by sand-bars. Another disadvantage suffered by many of the rivers in Africa is the large fluctuation in volume of water: rivers which are navigable in the wet season may become strings of pools in the dry season. In a very dry period the Orange River carries practically no water to the sea. This fluctuation in volume hinders navigation and lessens the value of these rivers for irrigation and power. This is not true of such rivers as the Congo and Nile, which rise in regions of heavy equatorial rainfall.

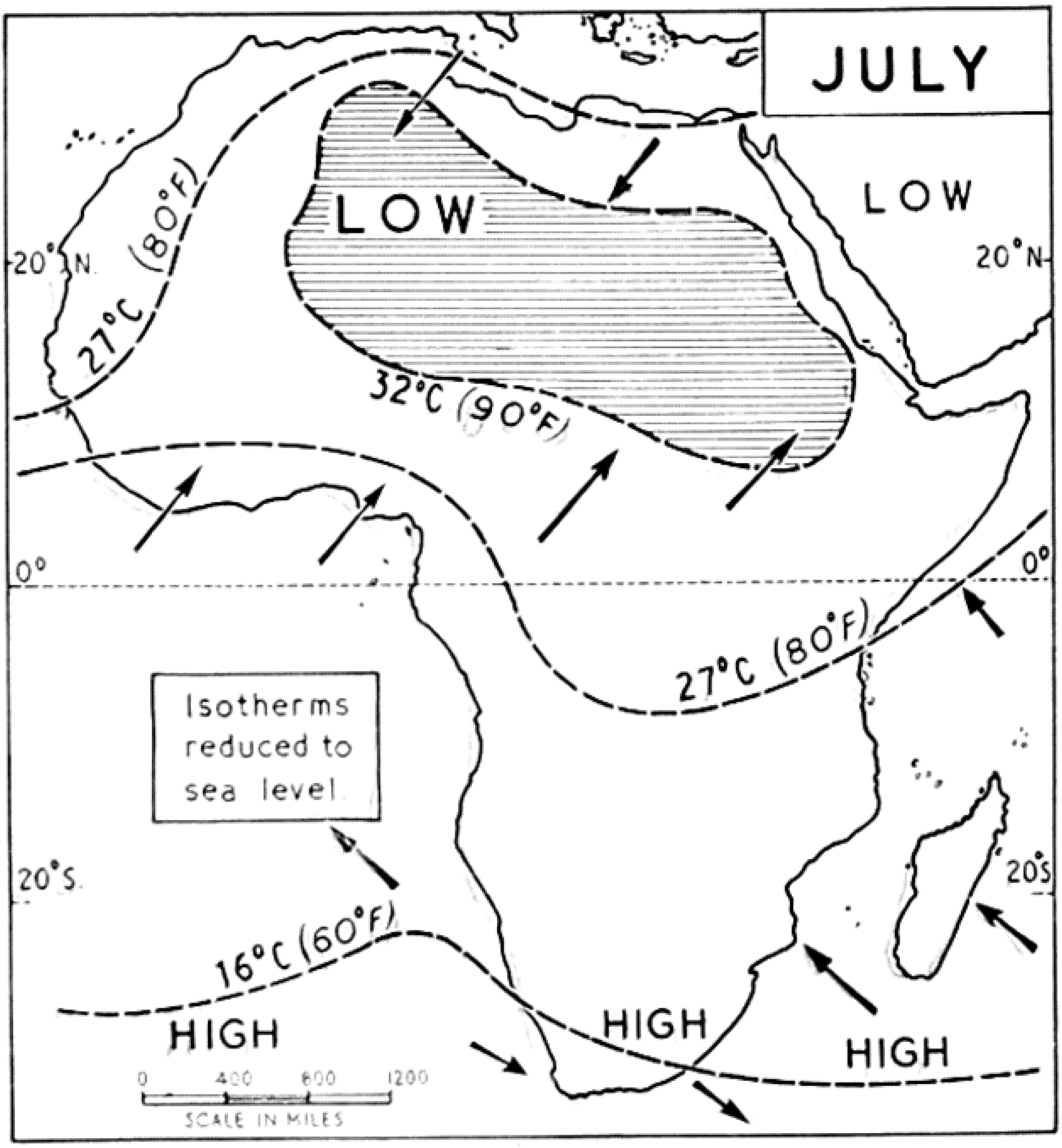


Fig. 2. GENERALISED MAP OF AFRICA SHOWING AVERAGE TEMPERATURES, PRESSURES, AND WINDS IN JULY.

The largest rivers of Africa are the Nile, Congo, Niger, and Zambezi.

## Climate

Africa is essentially a tropical continent and lacks large areas suitable for white settlement such as occur in Australia and South America.

Except on the high mountains, temperatures are high throughout the year and seasonal ranges of temperature less marked than daily ranges.

In July, the hottest part of Africa lies over the Sahara Desert, where afternoon temperatures may exceed 120° F.

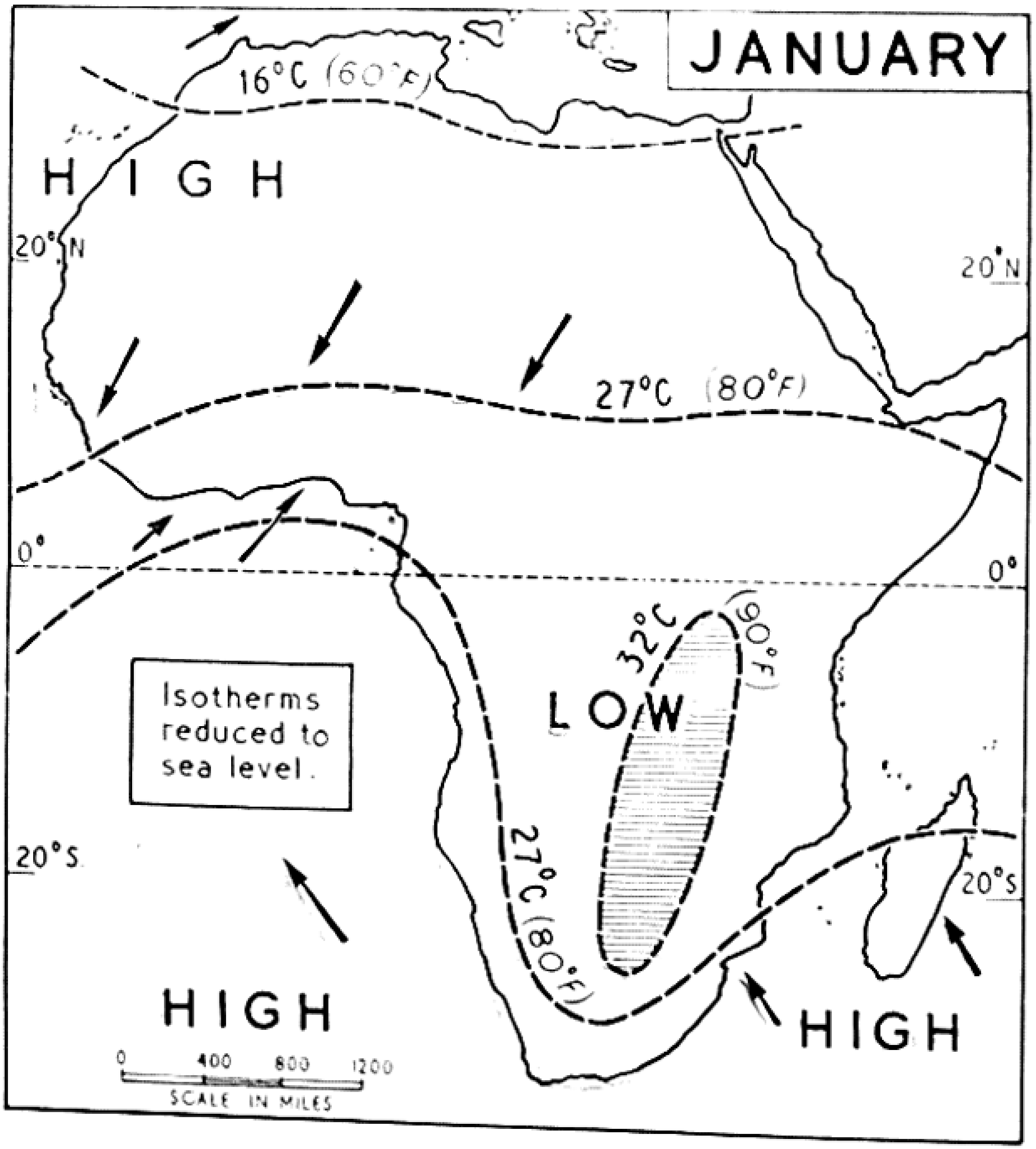


Fig. 3. Generalised Map of Africa showing average Temperatures, Pressures, and Winds for January.

Even with a daily range of 16 C°. (*60 F°.*) the actual average temperature of much of the Sahara is over 32° C. (*90° F.*) In South Africa, where July is the winter season, altitude helps to reduce the actual average temperature of the plateau which is less than 16° C. (*60° F.*). Since the daily range is often as much as 17 C°. (*30 F°.*), severe frosts are not infrequent.

In January, the actual average temperature of the Sahara Desert is about 16° C. (*60° F.*) and night frosts often occur during the winter. Most of Africa south of the Sahara has an actual mean temperature of 21°-27° C. (*70°-80° F.*), and there are no abnormally high temperatures such as are experienced over the Sahara in July.

OCEAN CURRENTS. The cool Canaries and Benguela currents (Fig. 4) along the west coast of Africa have a cooling effect on neighbouring coasts, while the warm Mozambique current tends to warm the south-eastern coast. Their influence is shown in the marked difference between the average annual temperatures of Port Nolloth (South-West Africa) and Durban (Natal):—

| | |
|---|---|
| Port Nolloth: | Latitude 29° 15′ S.<br>Mean annual temperature 14° C. (*57° F.*) |
| Durban: | Latitude 29° 52′ S.<br>Mean annual temperature 21° C. (*70° F.*) |

WINDS. The greater part of Africa lies in the belts of the North-East and South-East Trade Winds. There are, however, local modifications in wind direction due to seasonal distribution of low and high pressure areas. The most marked effect is that caused by the great heat, and consequent low pressure, experienced over the Sahara in summer which pulls the North-East Trade Winds across the Equator. In accordance with Ferrel's Law, they are deflected to the right of their course and become the South-West Monsoon which blows over the Gulf of Guinea coast and penetrates inland as far as Ethiopia (Abyssinia). In the western part of the Guinea coast area the South-West Summer Monsoon is replaced by the North-East Trades in winter but, in the eastern part, south-west winds persist throughout the year. Winds from the Indian Ocean are also pulled in towards Ethiopia in summer.

A similar in-pulling of the South-East Trades towards the heated interior is experienced in summer in South Africa and accounts for the summer maximum of rainfall in the east coast areas (p. 126).

North-west and south-west Africa between latitude 30° and latitude 40° have a seasonal change of wind due to the migration of the prevailing wind belts with the apparent north and south movement of the vertical rays of the sun. In their respective winters these regions lie in the south-westerly (north-west Africa) and north-westerly (south-west Africa) wind belts, and thus receive winter rain. In summer each of these areas lies in a belt of high pressure and experiences dry conditions.

SOME LOCAL WINDS. The *Harmattan* is a hot, dry, north-east wind which sometimes blows over the Guinea coast of West Africa in the winter. It originates in the high-pressure area of the Sahara and its low humidity makes it invigorating—a pleasant change from the humid conditions usually experienced there.

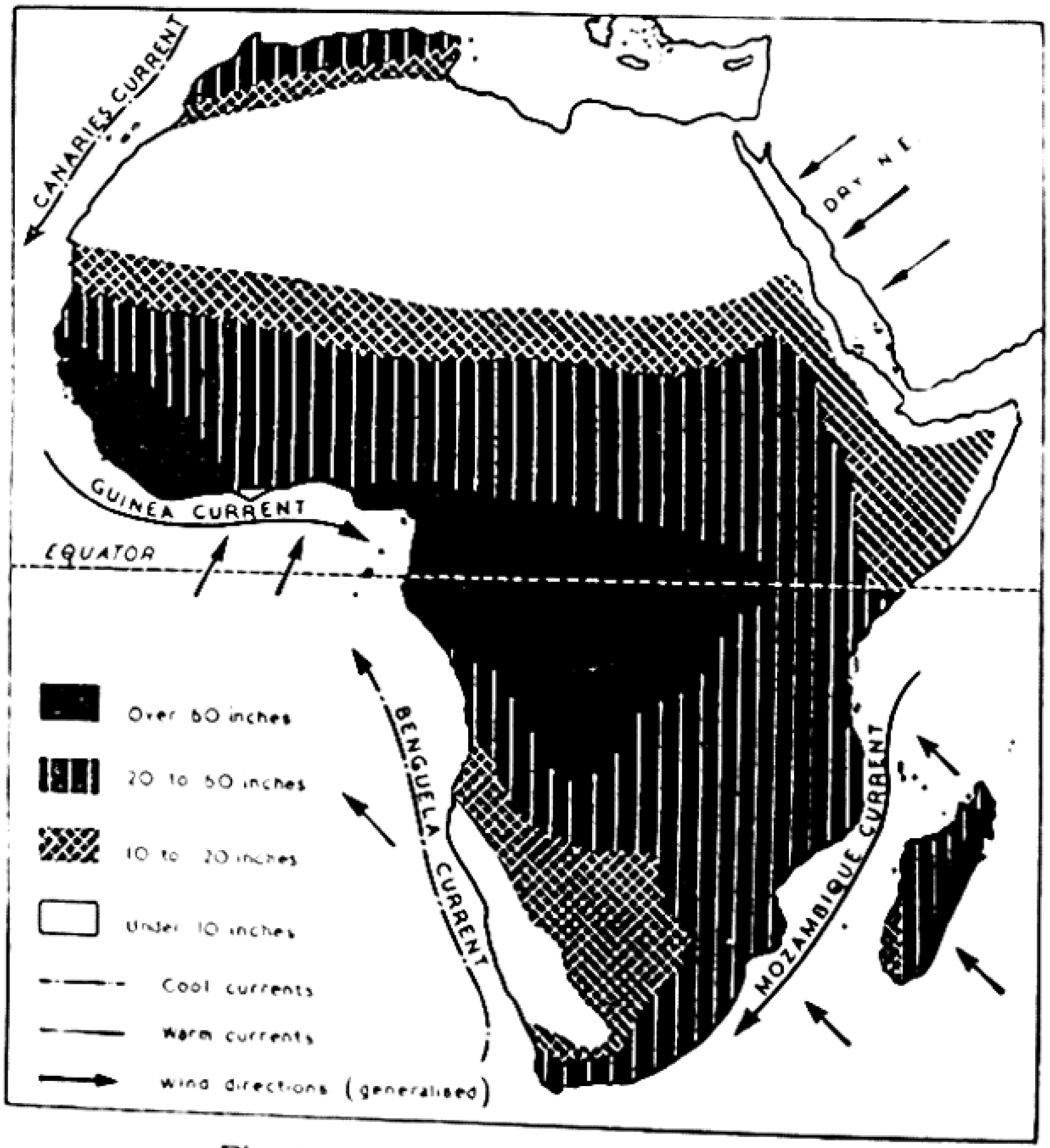


Fig. 4. AFRICA: ANNUAL RAINFALL.

The *Sirocco* also originates in the Sahara and blows over north-west Africa in winter. It is a hot, dry, scorching wind, its dryness accentuated because the area over which it blows normally has warm, south-west winds at this season.

The *Berg* wind, which is experienced on the coasts of South Africa, is a hot, dry wind which descends from the plateau and becomes heated in its descent. It is similar to the Föhn of Switzerland and the Chinook of the Canadian Prairies. Berg winds are more frequent in the winter and often result in high temperature conditions.

RAINFALL. The average annual rainfall map (Fig. 4) shows that roughly half of Africa has an annual rainfall of less than 20 in. In general, the wettest parts are those near the Equator which receive convectional rain, and the east coasts south of the Equator, where the South-East Trades are on-shore winds. On the western side the rainiest district is in Cameroon where the wet, south-west monsoon winds have to rise over high mountains. Here the average annual rainfall is about 400 in.

### Seasonal Rainfall and Natural Vegetation

In a general way it is possible to divide Africa into four seasonal rainfall belts which merge gradually into one another (Fig. 6):—

(*a*) No dry season.

(*b*) Most rain in summer and a dry season in winter.

(*c*) No rain, or very little rain.

(*d*) Most rain in winter with dry summers.

### No Dry Season

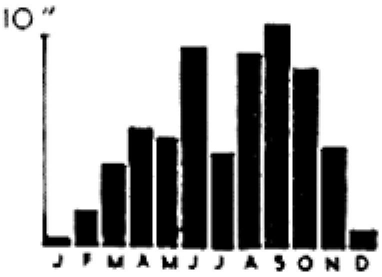
*Mobaye*, in the Congo Basin, has a typical equatorial rainfall. There is no dry season but the rainfall shows two maxima which occur just after the passage of the overhead sun when the temperatures are highest. Equatorial lowlands have high temperatures throughout the year and evaporation is therefore great. The damp, hot air rises and becomes so cool that it cannot hold all its water vapour which condenses to form masses of cloud and heavy convectional downpours. These rains usually come as thunderstorms which may occur any afternoon.

# RAINFALL REGIMES IN AFRICA

## NO DRY SEASON
Equatorial Type

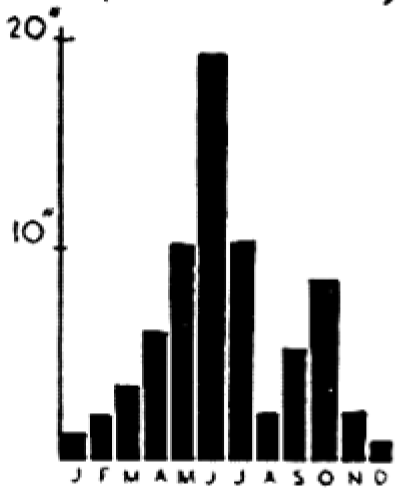
## NO DRY SEASON
but Summer Maximum.

*MOBAYE*
*(LAT. 4° 30′ N.)*



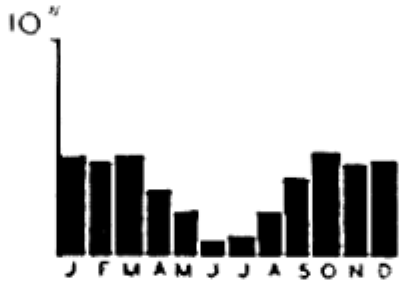
Two maxima of rainfall.

*LAGOS*
*(LAT. 6° 29′ N.)*



Maximum in June due to S.W. monsoon off Gulf of Guinea.

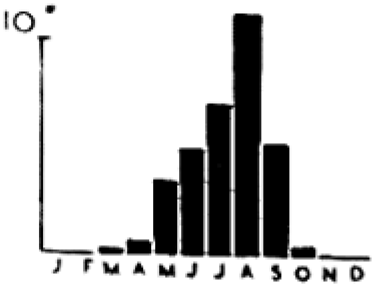
*DURBAN*
*(LAT. 29° 51′ S)*



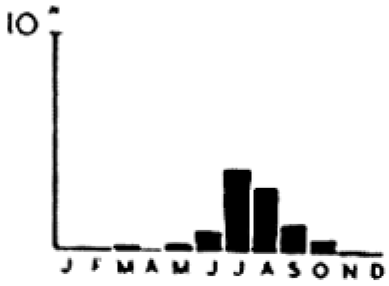
Summer maximum when winds are pulled in by low pressure of interior in southern summer.

## MOST RAIN IN SUMMER AND MARKED DRY SEASON IN WINTER. Sudan Type.

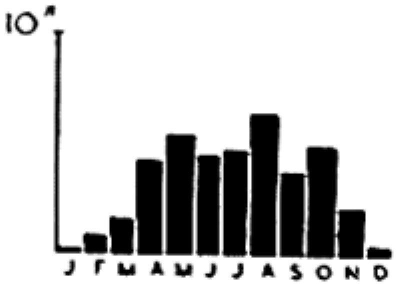
*KANO*
*(LAT. 12° N.)*



*TIMBUKTU*
*(LAT. 16°. 49′ N.)*

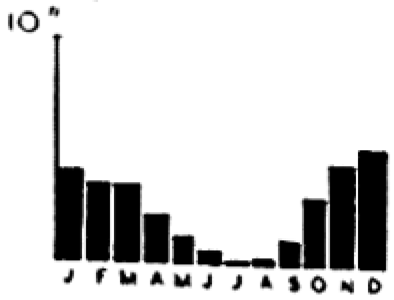


*MONGALLA*
*(LAT. 5°. 10′ N)*



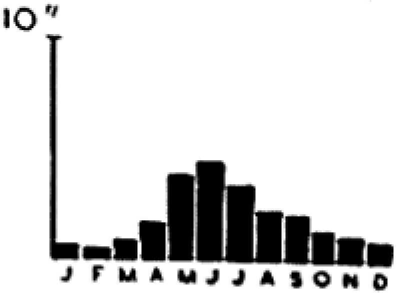
## MOST RAIN IN WINTER. Mediterranean Climate.

*ALGIERS*
*(LAT. 36° 50′ N.)*



Winter rain brought by S.W. winds

*CAPETOWN*
*(LAT. 33° 56′ S)*



Winter (southern) rain brought by N.W. winds.

Fig. 5.

*Lagos* is also near the Equator, and has convectional rains, but it differs from *Mobaye* in a very marked maximum in June. This is due to the south-west winds which are being pulled in from the sea by the low pressure in the Sahara (p. 4). The heavy rainfall, in the equatorial lowlands, combined with high temperatures, produces thick tropical rain forests, similar to those in the Amazon Basin (p. 165), but with different species of trees. The Hevea rubber tree, for example, from which the bulk of the world's supply of rubber is obtained, is not a native of the African forests, although there are several trees which yield a poorer type of rubber. Perhaps the oil palm is the most valuable tree of the African forests. Where accessible, hardwood such as mahogany, ebony, and rosewood, provide timber for export.

*Durban* is typical of that part of the east coast which lies in the South-East Trade Wind belt except where Malagasy (Madagascar) intercepts the rain. The cause of the summer maximum shown in Fig. 5 has already been discussed (p. 6).

The natural vegetation of this area is also tropical forest which is not so dense as that of the Congo Basin. Palms are very typical of the south-east coast of Africa, which may be compared for climate and vegetation with the east coast of Brazil south of Cape San Roque (p. 177), and with the east coast of Queensland in Australia, although the species of trees are different in each continent.

### Most Rain in Summer and Dry Season in Winter

As one goes north or south from the Equator, the two maxima of rainfall, shown in the graph for *Mobaye*, come closer together, and a dry season develops in the winter. This is because the two annual passages of the overhead sun are nearer together. The graph for *Mongalla* illustrates this point. Eventually, as one proceeds further from the Equator, the two maxima of rainfall become one, which occurs in summer, and the winter dry season becomes more marked. *Kano* (Fig. 5) experiences such a regime. Still further from the Equator the annual amount of rainfall decreases and the length of the dry season increases until at last the desert is reached. The rainfall graph for *Timbuktu* illustrates this type of rainfall regime.

The first effect of the dry season is the thinning out of the trees on the edge of the equatorial forests. Gradually, the natural vegetation becomes savanna, or parkland, similar in scenery to that of the campos of South America and the savannas of Northern Australia. In the savannas there are stretches of tall grasses and scattered drought-resisting trees such as the baobab, which has an abnormally large trunk, and various species of acacias. As the rainfall decreases, so the grass becomes less luxuriant and is dotted over with thorn bushes which can withstand long periods of dry weather. Eventually, on the edge of the desert, the natural vegetation consists of dwarf, drought-resisting plants known as scrub.

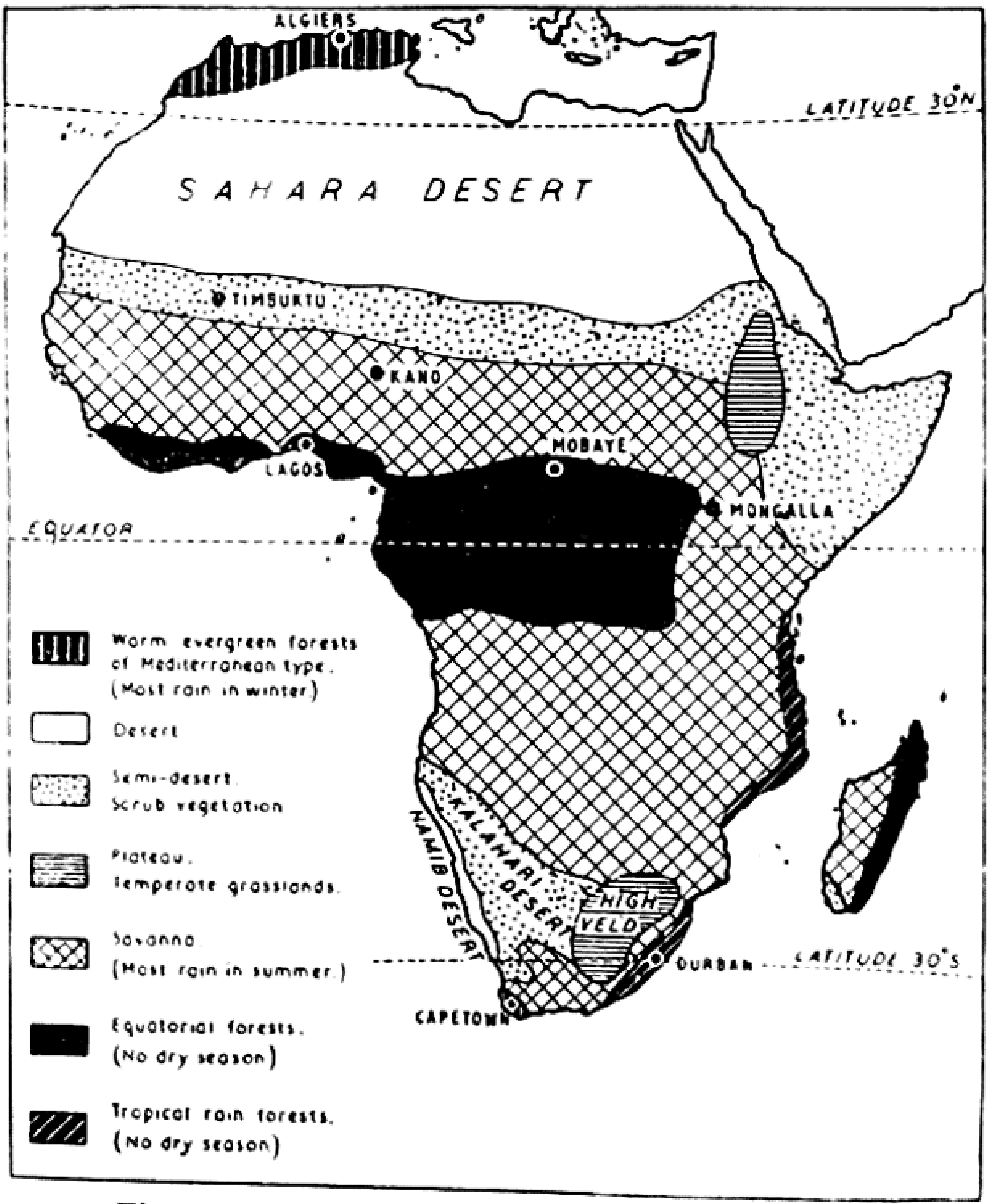

ALGIERS
LATITUDE 30°N
SAHARA DESERT
TIMBUKTU
KANO
MOBAYE
LAGOS
MONGALLA
EQUATOR
KALAHARI DESERT
NAMIB DESERT
HIGH VELD
DURBAN
LATITUDE 30°S
CAPETOWN
Warm evergreen forests of Mediterranean type. (Most rain in winter)
Desert
Semi-desert. Scrub vegetation
Plateau. Temperate grasslands.
Savanna (Most rain in summer)
Equatorial forests. (No dry season)
Tropical rain forests. (No dry season)

Fig. 6. AFRICA: VEGETATION BELTS (generalised).

Maize, millet, groundnuts, and cotton are characteristic cultivated crops of savanna lands.

Perhaps the most extensive area of savanna in the world is found in the Sudan and West Africa, so this type of climate and natural vegetation is known as the Sudan type wherever it occurs.

Savanna lands form a continuous belt round the equatorial forests of Africa and also constitute the typical vegetation of plateaux and poorer soils in equatorial areas. Thus, much of the East African plateau is savanna. South of the Equator the savannas, or bush veld, merge into the scrubland of the Kalahari Desert and are continued southwards in the temperate grasslands of the South African plateau known as the veld. In no part of Africa are there extensive grassy lowlands comparable to the pampas of South America, or the temperate grasslands of South-East Australia.

### No Rain or Very Little Rain

The hot deserts of the world usually lie on west coasts in the trade wind belts and are due to off-shore, dry winds and to the effect of cool currents off the coasts (Fig. 4). In Africa the Namib Desert of South-West Africa is a typical west coast desert. Inland it passes into the arid scrub of the Kalahari. The Sahara Desert is not, however, limited to the west coast but stretches across the continent to the Red Sea. This is due to the fact that the North-East Trade Winds, which have passed over land, are dry when they reach the north-east coast of Africa, and since they blow towards the Equator they become warmer and tend to hold any moisture they may have. Only on the higher slopes of the mountains which cross the Sahara is there a small rainfall—sufficient to provide poor pastures. Elsewhere, drought may last for years, or may be broken by an occasional storm of rain. High day temperatures with very small annual, and very large daily, ranges of temperature are characteristic of hot deserts.

Except in oases the true desert has no vegetation, but on high ground, or towards the fringes of the desert, dwarf, drought-resisting plants form a sparse cover. The date palm is characteristic of Saharan oases.

### Most Rain in Winter with Dry Summers (Mediterranean Climate)

The coasts of both north-west Africa (Algiers graph, Fig. 5) and south-west Africa (Cape Town graph, Fig. 5) which lie between latitude 30° and 40° have a typical Mediterranean climate with dry summers and winter rains due to the seasonal shift of the wind belts. Warm, evergreen forests clothe the wetter hillsides, but where the trees have been cut down, evergreen shrubs flourish—such as the laurel and myrtle which are adapted to stand dry summers. The drier areas and poorer soils have a cover of herbs and heaths. Grassland is rare. Many of the lowlands have been cleared for cultivation and are especially suited to wheat and fruits which ripen well in the summer sunshine, though irrigation is usually necessary. Vegetables grow well in the wet winters.

### Animals

Africa is very rich in wild animal life, many species being peculiar to the continent. The tropical forests are the home of many monkeys and brilliantly coloured birds. The largest known ape, the gorilla, is found wild only in the forests of tropical Africa.

The savannas teem with a great variety of animals—hoofed animals such as the antelope, buffalo, giraffe, zebra, rhinoceros, hippopotamus, and elephant; and carnivores, such as the lion and hyena. These species are absent from the fauna of South America and Australia. Big game hunting and the ivory trade led to the destruction of so many African wild animals that they are now protected by strict game laws. Although attempts have been made to domesticate the zebra and elephant in Africa, they have met with little success.

Tropical Africa has also a wealth of insect life. Amongst those which have hindered the development of the country are the tsetse fly, which infects man and beast with sleeping sickness; the mosquito, which carries malaria; and various ticks and other insects which attack domestic animals. The termites or "white ants" do much damage to timber in the tropical areas. Much has been done to counteract the ravages of insects by scientific research but the tsetse fly is still a serious pest in many areas. Locusts, though not confined to Africa, cause considerable damage to crops in all but the wet, forested areas.

### Discovery and Exploration

The Mediterranean coasts of Africa were well known to the Phoenicians, Greeks, and Romans before the Christian era. Indeed, the Romans had included all North Africa from the Barbary States to the Red Sea in the Roman Empire before the end of the first century A.D. Voyages along the west coast as far as Sierra Leone, and along the east coast to Cape Delgado, and perhaps even further, are said to have been made by the Phoenicians, and there are records of Greek penetration up the Nile as far as the sudd (p. 34). Whatever the effect these Mediterranean powers had on North Africa little has lasted until today. An event of far greater importance which began in the seventh century was the conquering of North Africa by the Arabs who introduced Mohammedanism, which is still the chief religion from the Mediterranean coast to some distance south of the Sahara where many negroes have been converted to the Moslem faith. By the fifteenth century, Africa had become a great obstacle to trade between Europe and the Far East. The warlike Turks had made the land trade routes across Asia dangerous, so serious attempts were made to discover a sea route round Africa. Navigators, led by the Portuguese, made several unsuccessful attempts. It was Vasco da Gama, a Portuguese captain, who, in 1497, made the first voyage round the Cape of Good Hope to the coast of Natal. From this point he sailed northward along the coast of East Africa and eventually reached India. Apart from a few trading posts and mission stations, few settlements and little penetration inland followed as a direct result of Vasco da Gama's achievement.

Penetration inland was difficult and dangerous. The African coast provides few good harbours; nearly half of it is backed by arid country and much of the remainder by dense, tropical forests. Even the rivers give little help since they are obstructed by falls and rapids, and their mouths are blocked by sand-bars, or split up into a maze of deltaic streams. Overland journeys were difficult, even where forest or desert did not hinder progress, for transport was mainly by human porterage since insect pests and disease made the use of oxen or horses well nigh impossible. Thus, explorers made slow progress and were often attacked by hostile tribes. With

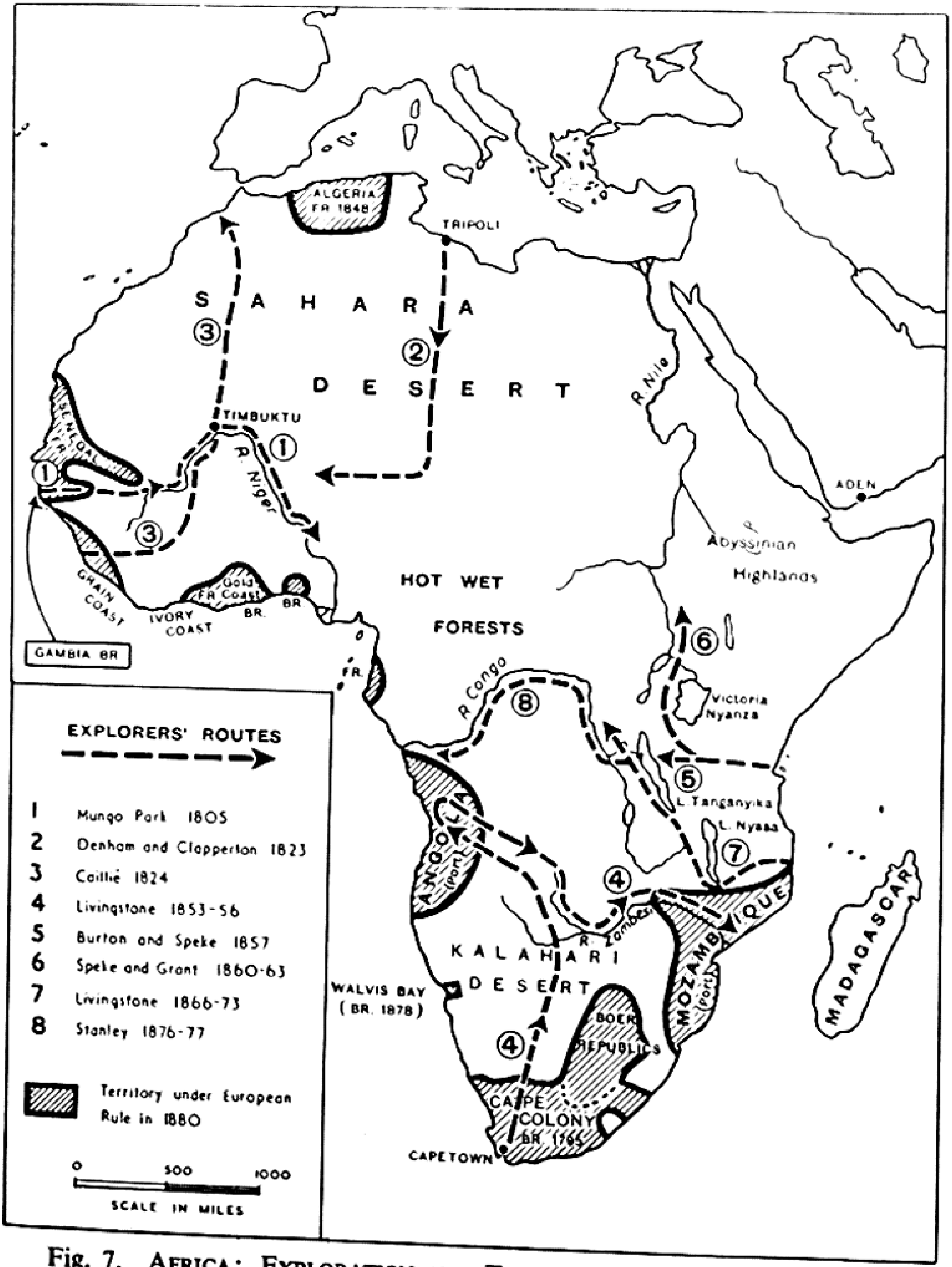


Fig. 7. AFRICA: EXPLORATION AND TERRITORIES FIRST BROUGHT UNDER EUROPEAN RULE.

such difficulties it is no wonder that little was known of the interior of Africa until the eighteenth and nineteenth centuries when many attempts were made to find out what lay behind the coasts. Here are the names of a few of the men who risked their lives, and in some cases lost them, in exploring unknown Africa, and who wrote records of their travels:—

*Mungo Park* followed the course of the Niger and lost his life in 1806 in an attack by hostile natives.

*Denham* and *Clapperton*, in 1823, and a Frenchman, *Caillié*, in 1824, crossed the Sahara.

*Livingstone* crossed the Kalahari Desert and followed the course of the Zambezi between 1853 and 1856.

Between 1857 and 1863, *Burton*, *Speke*, and *Grant* had discovered the sources of the Nile as the result of journeys from the east coast.

For more than twenty years *Livingstone* explored the heart of Africa, where he died from fever in 1873.

Between 1874 and 1877 *Stanley* traced the River Congo from Lake Tanganyika to its mouth.

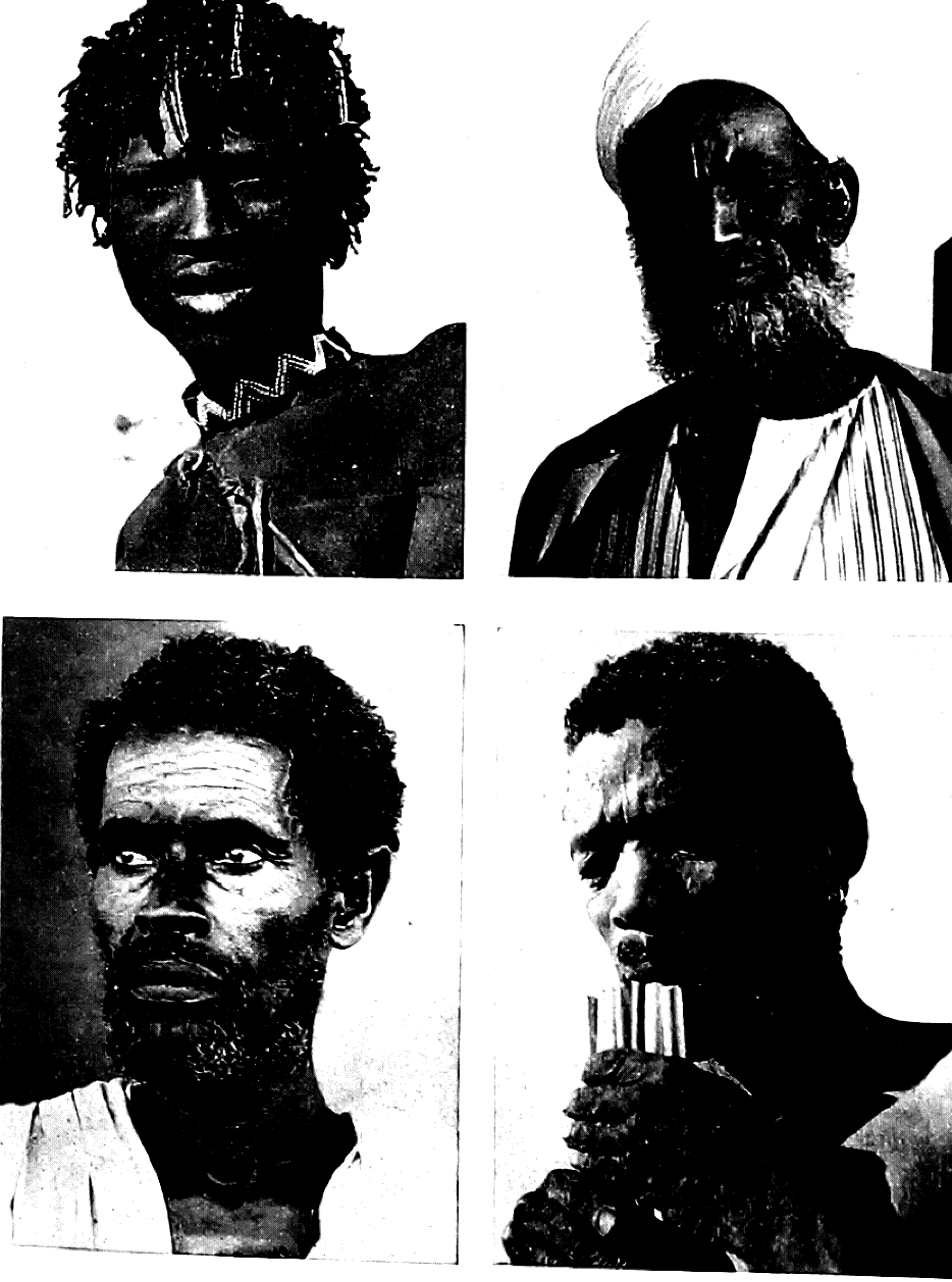
Then followed the carving up of Africa among the European powers, and its economic development.

## The People of Africa

From the point of view of population, Africa may be divided into White Africa and Black Africa.

North Africa, including the Sahara, has a white population. Arabs are the most numerous, but there are also non-arabic people such as the Berbers and Tuareg of the desert, and the Ethiopians of Abyssinia. Arab traders also settled on the coast of East Africa where their descendants live today.

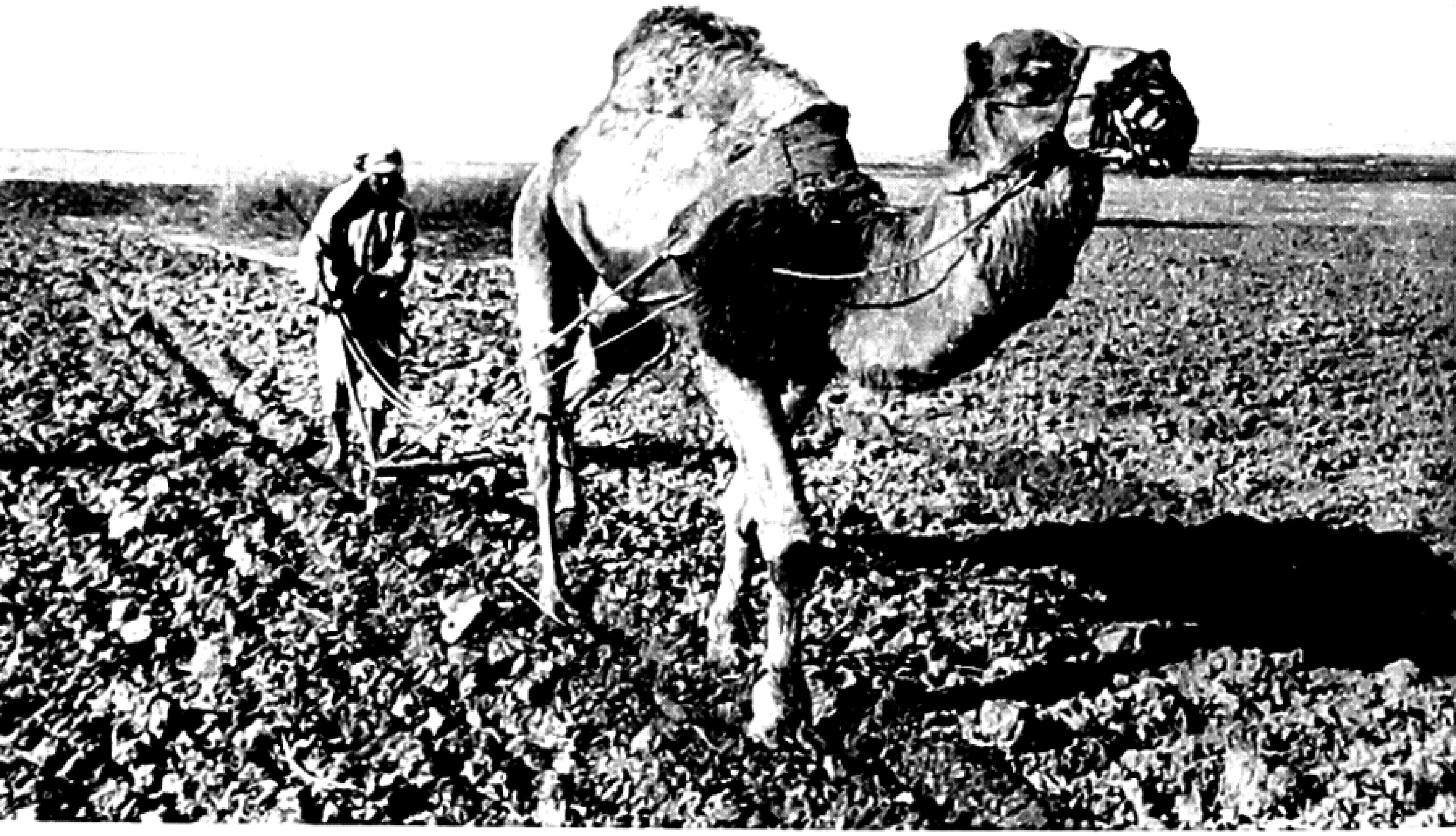
Black Africa lies south of the Sahara Desert and is inhabited chiefly by negroes who probably lived in Africa before the advent of any white races. Today, many Europeans of comparatively recent entry live in Black Africa, such as the Boers and British of South Africa, and white farmers in Rhodesia, and East Africa. Some of these whites were born in Africa. There are also many Indians in Black Africa who originally came from India to work on African plantations or to build railways. Their descendants are chiefly to be found in Natal and East Africa. Many have now become skilled workmen and merchants, especially in East Africa. The native inhabitants of Malagasy (Madagascar) appear to be



RACIAL TYPES

ABOVE. *Left*, Bushman.
(*South African Railways and Harbours.*)
*Right*, An Arab of Cairo.
(*Exclusive N. A.*)

BELOW. *Left*, Danakil Shepherd of Ethiopia.
(*Exclusive N. A.*)
*Right*, Hottentot with Reed Flute.
(*South African Railways and Harbours.*)



*Above.* Algeria. Primitive Ploughing. *(Picture Post.)*
*Below.* Tunisia. Irrigation Canals. *(Picture Post.)*

of mixed descent—partly negro, and partly from Malay and Polynesian races.

The true negro has a black skin, protruding thick lips, and curly, woolly hair, but his physical appearance varies somewhat from tribe to tribe. The tribe is the social unit among the negroes who have shown little tendency in the past to unite as one people. Thus, they became an easy prey to white invaders. As a result of slave raids many were shipped to America in the nineteenth century to work on plantations.

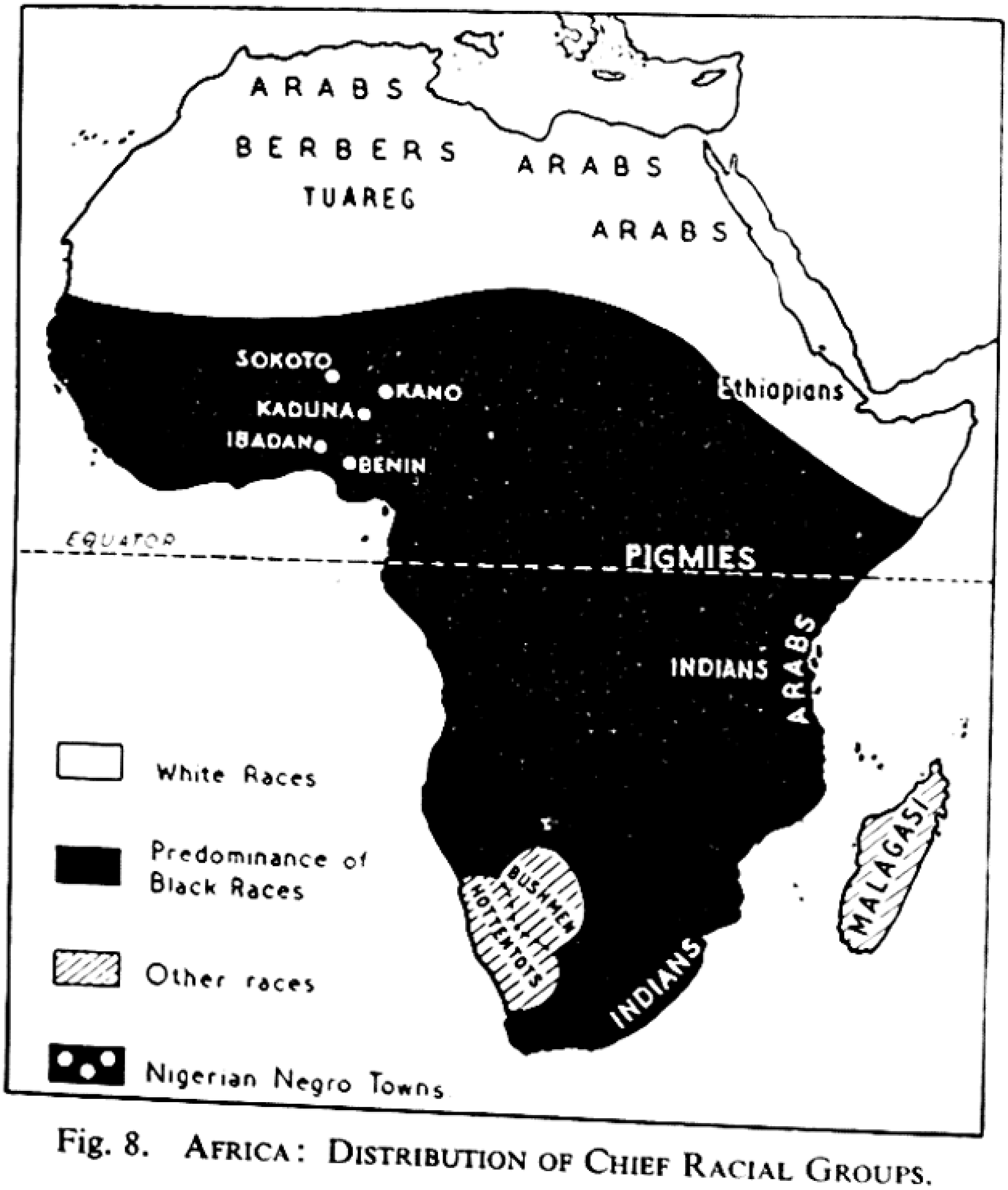


Fig. 8. AFRICA: DISTRIBUTION OF CHIEF RACIAL GROUPS.

African negroes are generally farmers. Their methods are sometimes primitive and wasteful; they often move to new land when that which they have occupied becomes infertile. The more advanced tribes practise crafts such as weaving, pottery, and metal work, but there is a great variation in cultural level. A few tribes are still primitive hunters.

The negroes usually live in villages but in West Africa there are negro towns with more than 100,000 people. Ibadan, in Nigeria, has over 600,000. Many of these towns are more like large villages than the towns with which we are familiar.

Three interesting primitive races which are not negro are the Pigmies, the Bushmen, and the Hottentots.

The *Pigmies* are a race of small, dark people with curly, rust-brown hair who inhabit the equatorial forests, chiefly in the Congo Basin. They have no permanent dwellings, but construct rough shelters from branches of trees. They live by collecting wild produce and practise no agriculture. Their numbers are decreasing.

The *Bushmen* are another primitive race inhabiting the Kalahari Desert. They are a small, yellowish, nomadic people who live by hunting. Bushmen were once more widespread in Africa since they have left rock drawings in many places which they no longer inhabit. Today, there are probably about a thousand in all, living in small groups or clans.

The *Hottentots* are a yellow-skinned people who seem to occupy a position between Bushmen and Negroes. They are nomadic cattle herders who graze their beasts on the poor pastures on the fringe of the desert in South-West Africa.

These three primitive races play no part in the economic life of Africa. They may be regarded as interesting survivals of some of the earliest inhabitants of the continent.

## Political Trends in Africa

At the beginning of this century most of Africa was under European control with Britain, France, Belgium, and Portugal as the chief colonial powers. Only Ethiopia and Liberia were independent.

Since 1955 the situation has changed rapidly. Many new independent states have come into being in tropical Africa, most of them having been previously under British or French rule. In several countries, however, the white minority is still dominant. Portugal still controls Angola and Mozambique. Rhodesia is largely governed by the British minority and in the Republic of South Africa, the native Africans take no part in the Government; the white minority maintains political and economic supremacy by rigid legislation.

# CHAPTER II

## NORTH AFRICA AND THE SAHARA

### THE BARBARY STATES

Morocco, Algeria, and Tunisia, formerly under French rule, are all independent sovereign states retaining close ties with France. They are sometimes known as the Barbary States because Berbers form the greater part of the native population; the rest are Arabs or the Tuareg of the desert. Berbers and Tuareg belong to a branch of the White or Caucasian race known as Hamites. They are fairly tall people with light-brown skins, brown, wavy hair, and straight, thin noses. Before the Arab invasion (p. 14) these people inhabited the whole of North Africa from the Atlantic to the Mediterranean. The Arabs, who resemble the Berbers in physical characteristics, belong to the Semitic race. All three races are Moslem, as are the many people of mixed Berber and Arab descent known as the Moors. Some European settlers live along the Mediterranean coast; they are mainly the descendents of French, Italian, Maltese, and Spanish immigrants.

**Relief**

The Barbary States are dominated by an east-west trending system of mountains. They consist of ranges and plateaux formed at the same time as the Alpine system of Europe, with which they were once continuous via the Straits of Gibraltar in the west, and Sicily in the east. In Algeria and Tunisia the highlands consist of a plateau, the northern and southern edges of which rise to form the Tell Atlas Mountains and the Saharan Atlas Mountains, respectively. The Tell Atlas consist of a series of ridges cut lengthwise by narrow, fertile valleys which, together with the terraced lower slopes of the hills, are known as the Tell (*Tell* means terrace). South of the Tell Atlas lies the Plateau of the Shotts, so called because many shallow, salt lakes, or shotts, lie on its surface. The average elevation of the plateau is about 3,000 ft—some 400 ft lower than the crests of the Saharan Atlas which form its southern rim. Beyond the Saharan Atlas stretches the Sahara Desert which is for the most part below 1,500 ft in altitude except where the Ahaggar Mountains rise to over 9,000 ft in the extreme south-east of Algeria.

In Morocco the mountains are higher and consist of four ranges separated by fertile lowlands. From south to north they are the Anti-Atlas, the High Atlas, the Middle Atlas, and the Riff Atlas (Fig. 9). Except for the Riff Atlas, these ranges do not reach the coast or run parallel to it. The High Atlas, which rise to over 14,000 ft, are the most lofty mountains in the Barbary States and are separated by low basins from the plateau-like Anti-Atlas to the south and the Middle Atlas to the north. The Riff Atlas form wild, barren country and curve northwards to the Straits of Gibraltar where they end in precipitous cliffs.

There are no large rivers in the Barbary States. Short streams drain to the Atlantic and Mediterranean coasts. Elsewhere, there are only wadis (dry water courses) which carry water after rain.

## Climate

The Atlas Mountains have a great influence on the climate and vegetation of the Barbary States since they tend to divide the country into a series of east-west belts. These are particularly well developed in Algeria and Tunisia where those tabulated on p. 23 may be recognised (see also Fig. 10).

Temperatures vary with altitude and distance from the sea. An average of 27° C. (*80° F.*) for the hottest month is experienced in the cloudless summer of the Mediterranean coast. Cooler summers occur along the Atlantic coast of Morocco where frequent coastal fogs, due to the presence of a cool current off shore, are experienced. The highest summer temperatures are those of the Sahara Desert where the average for the hottest month is about 38° C. (*100° F.*) and where actual temperatures of 58° C. (*136° F.*) have been recorded.

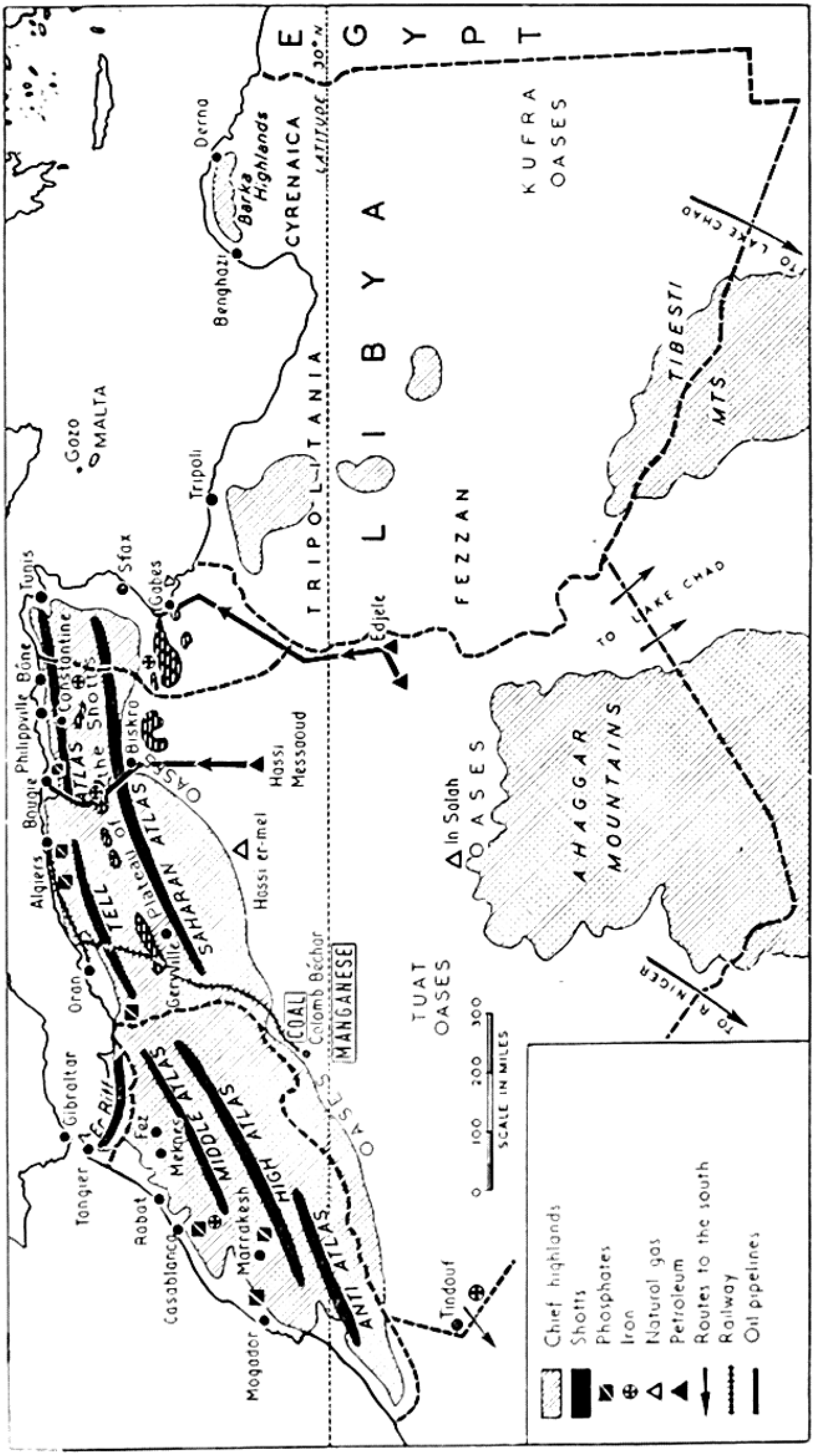


Fig. 9. AFRICA: THE BARBARY STATES AND THE SAHARA.

| | | |
|---|---|---|
| (*a*) The Tell and coastal valleys. | Mediterranean Climate. | Intensely cultivated. Vines, olives, cereals, vegetables, tobacco. |
| (*b*) Tell Atlas Mountains. | Mediterranean Climate with greater rainfall on northern slopes than on coast, and cooler winters. | Evergreen Forest Cork oak. |
| (*c*) The Plateau of the Shotts. | Low annual rainfall—less than 15 in. Large daily range of temperature; night frosts common. | Poor grassland. Esparto grass, sheep, and goats. |
| (*d*) The Saharan Atlas Mountains. | Low rainfall. | Little vegetation. Scattered drought-resisting trees and plants in valleys. |
| (*e*) The Sahara. | Seldom any rain. | Dates from oases. |

In winter, the mean January temperature of the lowlands is about 10° C. (*50° F.*) but it is much cooler on the plateau and on the mountains. Snow frequently covers the mountains above 3,000 ft in winter, and lies on the highest parts of the High Atlas throughout the year. The coastal districts have a Mediterranean climate but rainfall decreases eastward along the Mediterranean coast from 33 in. a year at Tangier to 18 in. at Tunis. In Morocco, where the mountain ranges are not parallel to the coast, rain penetrates further inland and the windward northern slopes have a rainfall of about 30 in., while the south-facing slopes are dry. The effect of the cool Canaries Current (Fig. 4) is felt on the Atlantic coast of Morocco where the annual rainfall is little over 10 in.

### Natural Vegetation

Rainfall is the chief factor controlling natural vegetation. The wetter sides of the mountains and the coastal districts were once covered with warm, evergreen forest of cork oak, evergreen oak and, at higher altitudes, cedar. In the past, many trees have been cut down, and forest is now mostly confined to the mountains if rainfall is adequate. The effect of rainfall is well illustrated in Morocco where the northern slopes are forested and the southern slopes carry only dry scrub. When the rainfall is not sufficient for trees, drought-resisting plants, known as maquis, are found. This is also true of areas such as the Riff Atlas where the underlying rock is mostly limestone. An important native plant of the maquis is the olive; it is now widely cultivated.

The Plateau of the Shotts, with its low rainfall, has a cover of coarse grass suitable for pasturing sheep and goats. Esparto grass, used for the manufacture of paper, grows in this area.

South of the Saharan Atlas, a sparse cover of drought-resisting plants soon gives way to the bare waste of the Sahara Desert where vegetation can exist only if there is an underground supply of water on which the oases depend. The date palm is the characteristic plant of the oases.

The Ahaggar Plateau of southern Algeria is high enough to receive sufficient rain to support poor pastures which are used by nomadic herders—the Tuareg.

## Economic Products of the Barbary States

Although the Barbary States produced grain and fruit in the time of the Carthaginians and Romans, pastoral farming was the chief occupation before the French occupation which began in the latter half of the nineteenth century. Under French guidance, however, the growing of crops became very important, but it is limited to the Tell and the coastal valleys and plains of Tunisia and Morocco. Fruit and cereals are especially important in view of the Mediterranean climate. Grapes and olives, and other fruits such as plums, figs, citrus fruits, almonds, and pomegranates, are grown for export, especially to France. In winter, vegetables and salad crops do well and form an important export, since they arrive in France before similar crops are in season there. Wheat and barley are the principal cereal crops and in good years a surplus is exported. Cotton and tobacco are also grown successfully.

On the dry plateau pastoral farming predominates; sheep and goats are reared. The pastoral industry is largely in the hands of Berbers and Arabs, and live sheep, hides, and wool are exported. Cork from the bark of the cork oak and esparto grass from the plateau are produced for export.

**Morocco**

Morocco has a population of fourteen million people. The northern part of the country, formerly under Spanish occupation, is economically backward. A million Berbers pasture sheep and goats in the lowland area between the Mediterranean coast and the Riff Mountains but there are few settled farms. Although rain is plentiful, most of the water drains to the sea. Efforts are being made to conserve the water to irrigate crops of barley and vegetables. Small vineyards are being planted.

Iron ore is mined close to Melilla (a Spanish port) and a steel mill is to be established at Nador. Petroleum is produced about seventy miles east of Rabat but it does not yet meet the needs of the country.

The long coastline and the fine scenery of the Riff are attracting increasing numbers of tourists.

The coastal lowlands on the Atlantic side of Morocco are the richest area in the country. There is a good rainfall from November to April and citrus fruits and vegetables are grown for the French market. The northern slopes of the mountain ranges are well forested and the plateau areas between them provide pasture for sheep and goats.

Phosphates are worked extensively inland for export as a fertiliser. Other exports include esparto grass, cork, hides and skins, manganese, zinc, and lead.

The chief towns of Morocco are on or near the coast. They include:—

*Rabat* (262,000), the capital, and the chief seat of the Sultan, lies on the Atlantic coast.

*Casablanca* (1,180,000) is the chief commercial centre of Morocco. Although its natural harbour is poor, breakwaters have been built and harbour installations constructed. Casablanca is the centre of Moroccan railways. It is the chief phosphate port and manufactures superphosphate fertiliser. It also exports eggs, skins, wool, early vegetables, and fruit, and it is an important fuelling station.

*Fez* (250,000) and *Marrakesh* (265,000), in the inland plateau area, are old Moroccan capitals which have been little affected by modern development. Fez is an important centre of the Moslem religion.

*Tetuan* (117,000) is connected by rail with the port of *Ceuta.* It has small industries making Morocco leather and pottery.

*Tangier* (166,000), once the most important port in the Barbary States, has declined in importance. For two months every summer it is used as the capital. Strategically it occupies a key position at the entrance to the Mediterranean.

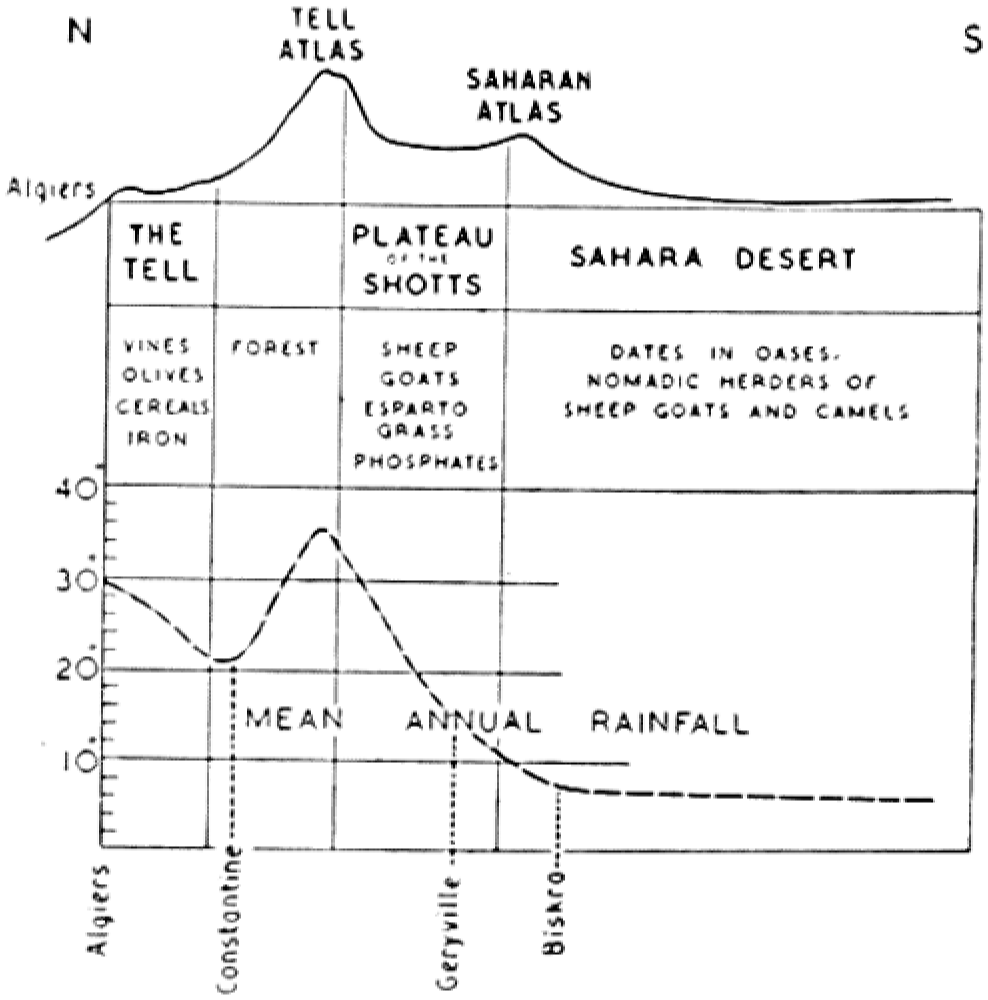


Fig. 10. Section across Algeria showing Relation of Relief to Rainfall and Products.

## Algeria

Algerian independence came in 1962, after a long struggle between the Arab and Berber people and the large numbers of French settlers, many of whom had always lived and worked in the country. Most of them have now returned to France and the Algerians have taken over the abandoned farmlands and have nationalised the larger estates.

The physical characteristics, rainfall, and products are shown in Fig. 10.

Algeria extends many miles southwards from the Saharan Atlas to include a vast area of the Sahara Desert (see Fig. 9) which is rich in minerals, including oil. These are exploited jointly by Algeria and France.

Coal is mined at Colomb Béchar, iron at Tindouf further to the south-west, and oil is produced at Hassi Messaoud and at Edjele near the Libyan border (see Fig. 9). The oil from Hassi Messaoud is taken by pipeline to the port of Bougie (between Algiers and Philippeville) in Algeria, and the Edjele oil is piped to the coast of Tunisia near Gabes. A pipeline carries methane gas from Hassi-er-mel to the port of Arzew, east of Oran. Here the gas is liquefied and carried in tankers to Canvey Island in Britain and to France. One-tenth of Britain's gas comes from this source. An extensive new oilfield has recently been discovered about fifty miles south-east of Hassi Messaoud. Other minerals found in the Sahara include uranium, copper, manganese, and tin.

The development of Saharan resources depends to a large extent on close co-operation between France and the countries of Algeria and Tunisia, since the transport of the minerals in large quantities depends on the railways and pipelines which pass through these countries to Mediterranean ports.

The chief towns of Algeria include:—

*Algiers* (885,000), the capital, is the largest. Although its natural harbour is poor, improvements have made it an important trade centre. Algiers is a coaling station and trades largely with France, exporting produce from the Tell and plateau, as well as iron and dates. The town is built among hills and consists of a modern town with tourist hotels and commercial buildings, and a picturesque native town of narrow streets and bazaars.

*Oran* (280,000) is a trade rival of Algiers and is increasing in importance. It has a good harbour and is connected by rail with Saharan oases via the Plateau of the Shotts. It exports iron, esparto grass, and dates, as well as produce from the Tell.

*Philippeville* (88,000) and *Annaba* (*Bone*) (164,000) are the chief phosphate ports of Algeria. *Constantine* (255,000), the most important inland town, is situated fifty miles from Philippeville with which it has rail connection. The district round Constantine is important for growing grain.

### Tunisia

Tunisia is the smallest—and the poorest—of the Barbary States, with a population of 4¼ million. The chief crops are wheat, oats, and barley. Vines and olives are grown. Phosphates and iron ore are worked.

Although a little coal occurs in Tunisia, mineral fuels are scarce and there is little manufacturing. What industries do exist are concerned with the processing of raw materials—the making of wine, olive oil, cigarettes, paper-pulp, and plastics. Local crafts include the making of pottery, carpets, and leather goods which are often sold to tourists. Fishing is an important industry and fish are exported to Italy and France.

More than half the trade of Tunisia is with France. *Tunis* (700,000) is the capital and chief port. It is also renowned as a tourist centre since remains of ancient Carthage, and of Roman and pre-Roman occupation lie nearby. Strategically, Tunis commands the southern passage between the western and eastern basins of the Mediterranean.

Other ports include *Sfax* (70,000), *Bizerta* (47,000) an important industrial centre, and *Gabes* (25,000), the terminus of the pipeline from the Edjele oilfield in Algeria.

## LIBYA

The Arab Kingdom of Libya stretches along the Mediterranean coast from Tunisia to Egypt. It is divided into three provinces—Tripolitania and Cyrenaica, which are separated by the Sirte Desert across which communications are poor, and the desert province of Fezzan which borders Algeria. The coastal region flourished in Roman times when supplies of water were carefully conserved in specially constructed collecting galleries, but under later Arab and Turkish rule it became neglected. In 1911 Libya became an Italian colony and a new era of prosperity was initiated. In 1951 the country became independent. It has a population of 1½ million, mostly Arabs, three-quarters of whom live in Tripolitania.

### Surface Features

Much of the country is lowland, often covered by sand dunes, but solid rocks form highlands behind the coast of Tripolitania and in the Barka plateau, west of Benghazi. There are no permanent streams. Most of Libya is desert.

### Climate

Since the coast of Libya is lower and further south than that of Barbary States, temperatures are higher. The area has a very low rainfall; along the coast it decreases from 16 in. a year at Tripoli to less than 10 in. east of Benghazi. The Barka Plateau is the rainiest area and receives about 18 in. a year. Southwards, rainfall decreases rapidly to the bare wastes of the Libyan Desert. Most rain falls in winter.

### Products

In Roman times, Libya and Tunis were described as the "granary of the Empire". In those days the rainfall was greater but over-cultivation caused the soil to be blown away by the winds, and sand encroached on the cultivated land.

The highlands receive enough rain to maintain a cover of poor grass and scrub which is used by nomadic Berbers and Arabs for pasturing sheep, goats, and camels. Along the coast, and in wadis (dried water courses), where underground water is available, cultivation is possible. The Italians did much to conserve water and construct irrigation works. They introduced modern methods of cultivation, built roads to the coast, and planted thousands of trees, which not only prevent soil erosion but tend to increase the rainfall. The Italian community, however, has dwindled. Near the coast olives, almonds, figs, pomegranates, apricots, oranges, and dates flourish, and fields of barley are cultivated. Some modern farms are run by European settlers, but their numbers are decreasing. Away from the coast, on the desert fringe and in oases, Arabs and Berbers keep flocks and, where possible, grow a few crops of grain. Their mode of life has remained almost unchanged for centuries.

Oilfields are developing in Libya with amazing speed and are changing one of the poorest countries in the world into a relatively prosperous one. The main centres of production are at *Zelten* (with a pipeline to *Marsa el Brega*), *Dahra* (pipeline to *Ras el Sidr*), and *Beida*. Exploration for new oilfields continues. The position of the Libyan oilfields in relation to the markets of Western Europe is entirely favourable. They are nearer the coast than the Algerian oilfields and 3,700 miles nearer to Britain than the oilfields of the

Middle East. Unfortunately the oil boom has attracted peasant farmers to the towns and as a result Libya is importing much of the food consumed. The country will only establish a balanced economy if wealth derived from oil exports is used to encourage modern methods of agriculture. Some workers are being brought in from Morocco to swell the industrial labour force.

In 1963 Libya exported £132 million worth of oil. Other exports which included olive oil, esparto grass, and hides were worth only about £1 million.

Imports include food, manufactured goods and machinery and equipment for the oilfields.

### Towns

*Tripoli* (184,000), the winter capital of Tripolitania, is a modern port. Railways run along the coast and inland for a short distance. Tripoli is also a road centre.

*Derna* is in a fruit-growing area watered by springs which result from the relatively good rainfall of the Barka Plateau. *Benghazi* (80,000), the summer capital and chief town of Cyrenaica, is a centre for sponge fisheries.

A new capital is being built at *Beida* in the mountains east of Benghazi.

## THE SAHARA DESERT

The Sahara Desert extends across Africa from the Atlantic Ocean to the Red Sea. Its surface is by no means uniform. It is crossed by highlands which in places rise to over 10,000 ft, the peaks of which may be covered by snow in winter. Elsewhere there are basins and plains, and depressions which lie below sea level.

Except on the highlands, rain seldom falls and many years may pass without a single storm. Very rarely there may be a torrential downpour for a short time and then the drought continues. During the Ice Age, when glaciers covered northern Europe, the Sahara had more rain, and streams which drained from the highlands cut deep valleys, now merely dried-up water courses known as wadis. Although they contain no streams, water may sometimes be obtained by digging wells in their beds. Where underground water is easily obtained in the desert there are oases.

Owing to the extreme dryness of the air, clouds are rare and uninterrupted sunshine may cause air temperatures to rise at noon above 54° C. (*130° F.*), while the bare ground may be much hotter. At night heat rapidly radiates into the cloudless atmosphere and temperatures may fall below freezing point. Such great daily ranges of temperature are characteristic of hot deserts. A daily range of 28 C°. (*50 F.°*) is quite common.

Exposed rocks expand with the heat during the day and rapidly contract at night, causing the surface layers to crack and peel off like the skin of an onion. At the foot of rocky slopes falls of angular debris, known as scree, soon collect. Sometimes large areas of the desert are covered with rock fragments, especially near highlands. Such rock-strewn areas are known as *reg desert*, and are very difficult ground for travellers to cross.

Strong winds are also characteristic of deserts. They pick up the small rock fragments and hurtle them along in a sand blast which etches out the softer layers of exposed rocks, and polishes the face of harder rocks, thereby producing more small fragments which make up the desert sand. The grains of sand are very rounded by friction with each other when blown through the air. The etching out of the softer layers produces curiously shaped rocks not unlike great mushrooms. They may be anything up to 100 ft in height.

Where the force of the wind is lessened by some obstacle such as a rock or desert plant, sand is deposited. This may take the form of a sheet of sand or of sand dunes. Parts of the Sahara Desert, known as the *erg desert*, are covered by sand dunes, many of which are in the form of crescents, like bunkers on a golf course. Frequently the dunes advance as the wind blows the sand from the windward side and deposits it in the lee of the dune. Near the fringes of the desert shifting dunes encroach on the vegetation which holds the sand and so increase the sandy waste. In the Sahara there are also areas of bare rock known as the hamada. These occur especially round the highlands. The surface of the desert is thus very diverse.

Travellers across the Sahara not only have to contend with high day temperatures, cold nights, and lack of water, but they may also experience the dreaded simoom, a strong wind which fills the air with a whirling mass of sand. Man and beast have then to shelter until the storm is past.

## Dwellers in the Desert

Water is essential for man and animals and therefore desert dwellers either inhabit oases, or the highlands and desert fringes where poor pastures are to be found. Arabs, Berbers, and Tuareg, are the chief inhabitants of the Sahara but there are people of negro origin in the southern oases, probably brought there by slave trading in the past.

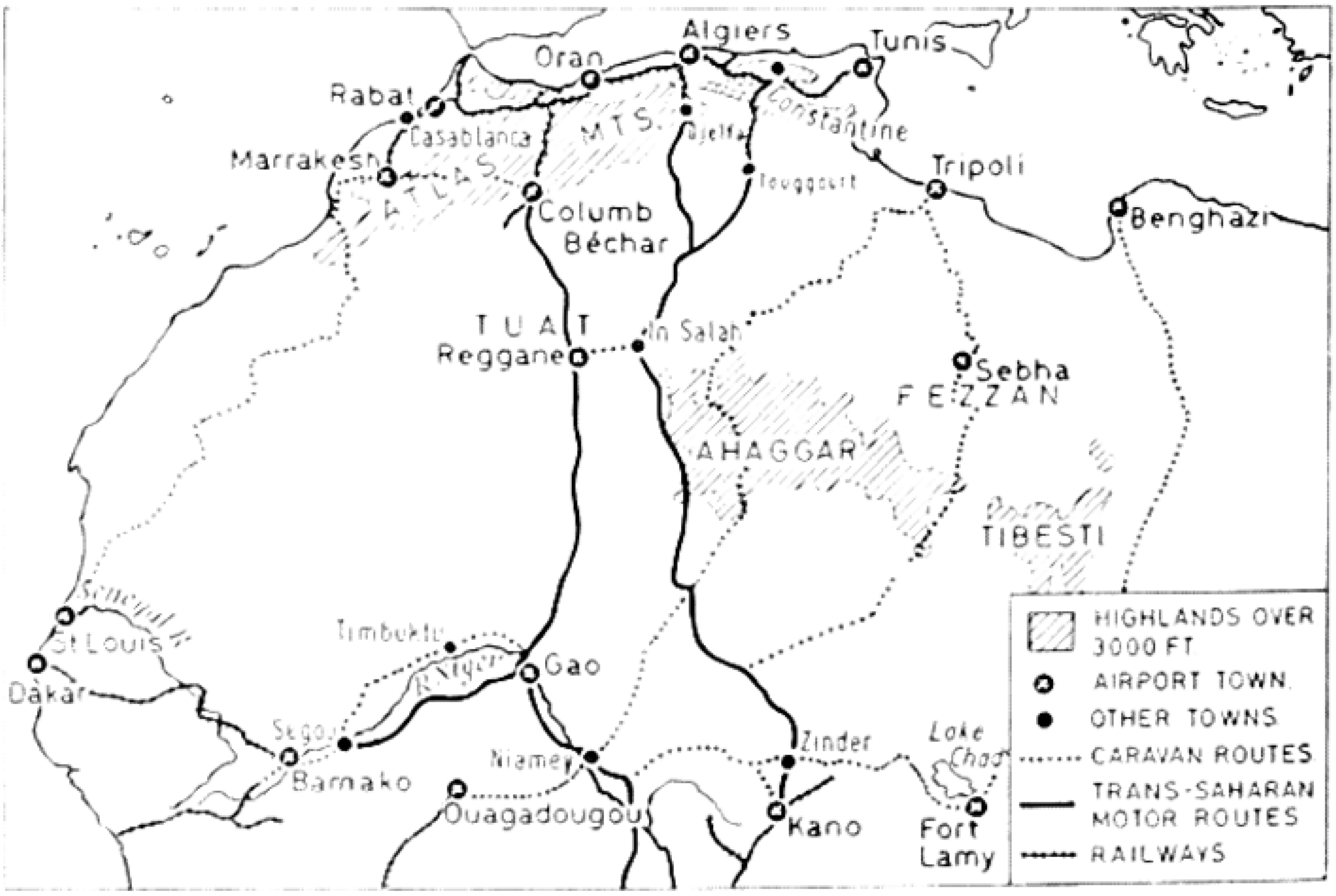


Fig. 11. Chief Routes across the Sahara Desert.

In the larger oases are Arab villages with their tall, flat-roofed mud houses built close together. By building tall houses, valuable ground space is preserved for food crops of dates and grain. Many of the people are nomadic, wandering in search of pasture for their flocks of sheep, goats, and camels. These people usually drive their flocks to highland pastures in summer. The home of the desert nomad is his tent—a large,

*Above:* Feluccas on the River Nile. (*Picture Post.*)

*Below:* The Encroaching Desert—Tall Palm Trees almost Overwhelmed by Sand. (*Picture Post.*)

[illegible] Cataracts on the River Nile at Aswan. (*Egyptian Education Bureau*)

Sudan. Sudd Swamps (Masses of Floating Vegetation) on the River Nile near Juba. (*Picture Post*) being left open to form a kind of awning. On the floor are carpets which serve instead of chairs and beds. The men and boys look after the flocks while the women cook, milk the goats, ewes, and camels, make butter, and weave carpets, tents, and clothes.

Some desert dwellers are skilled camel men and drive caravans across the desert, stopping at wells and oases to water their animals. The camel is the chief beast of burden. The Arabs have a riddle which asks: "What is Allah's greatest gift to man?" The answer is: "a camel". The camel is particularly fitted for life in the desert. It has special provision against shortage of food and water since its hump stores fat, and the honeycomb nature of its stomach absorbs sufficient water to serve the animal as long as a week. It can also eat very rough food such as the sharp, prickly plants which grow in arid regions. On each foot are two large toes which help to prevent it from sinking in the sand. Its nostrils and eyes can be tightly closed against sandstorms. The camel has great endurance and will do incredibly long marches in terrific heat. A good young camel can carry 1,000 lb. for an entire day. At one time camel caravans were essential for trade. Salt from the desert was exchanged for woven cotton and corn at Timbuktu and Kano. Caravan routes linked up the Saharan oases, and became focal points, but caravan traffic has long been declining. The discovery of petroleum in the Sahara stimulated road building and motor transport has changed the way of life of many of the tribesmen; today they are seen driving petrol tankers and lorries.

Regular motor services are now in operation between Algeria and the Niger and Chad Basins (Fig. 11). The French have even considered building a desert railway from Algiers to the Niger Basin, which would continue the line from Columb Béchar to Gao on the Niger.

There are also regular air services from the Barbary States to various places in West Africa. Planes may refuel at Reggan in the Tuat oases, or at Sebha in the Fezzan.

# CHAPTER III

## AFRICA: THE NILE LANDS

### The Nile Valley

From its source, near Lake Tanganyika, the Kagera River carries the headwaters of the Nile into Lake Victoria (3,700 ft). The river which emerges from the northern end of the lake is known as the Victoria Nile. It flows over the Owen and Ripon Falls to Lake Kyoga and then makes a further drop over the Murchison Falls into the western Rift Valley (Fig. 12) where it enters Lake Albert. From Lake Albert to Nimule, where the river enters the Sudan, it is called the Albert Nile, and from Nimule to Khartoum—the White Nile. On leaving Lake Albert the river follows the rift valley for about 200 miles and then emerges into a low, inland basin which extends northwards to beyond its junction with the Sobat. Both the White Nile and the streams which drain this basin are interrupted and split up by swamps in which reeds, papyrus, and other marsh plants often block the river with a solid mass of vegetation known as the "sudd". A channel through the sudd is maintained only with difficulty. During the summer rains, vast areas are flooded and much water is wasted by evaporation. Below the junction of the Bahr-el-Ghazal there are no left bank tributaries, but three important rivers which rise in Ethiopia join the White Nile on its right bank. These are the Sobat, the Blue Nile, and the Atbara.

The gradient of the White Nile remains low as far as Khartoum. Then the river flows through a sandstone area which is crossed in places by masses of hard granite. Between Khartoum and Aswan the Nile flows over the hard rocks and rapids or cataracts occur. For some 250 miles below Aswan the Nile flows in a narrow valley less than two miles wide which is cut in sandstone. The river then passes for 500 miles through a limestone plateau where its flood plain widens to as much as fourteen miles, the outer edges being bordered by high cliffs of 1,000 ft or more.

Cairo is situated at the head of the Nile Delta, a large tract of low-lying land stretching some 100 miles northwards and reaching as much as 150 miles in width near the coast. Most of the delta has been drained, but lagoons and salt marshes still exist on the seaward side.

### The Water of the Nile

Egypt has been called "the gift of the Nile" because the people depend on the river water for their existence.

The Nile rises near the Equator in an area of good rainfall, well distributed through the year, and where the lakes—Victoria, Edward, and Albert—act as natural reservoirs which regulate the flow of water and prevent the Nile from drying up in its long journey through the desert. A dam near Owen Falls in Uganda controls the level of Lake Victoria and provides water for irrigation in the Sudan and Egypt. Hydro-electricity is generated for Uganda industries.

Irrigation in Egypt and the Sudan depends not only on the normal flow of the Nile but also on the floods which occur during the summer months. The Sudan lies in an area of summer rainfall which increases the water carried by the streams which drain into the White Nile. A far greater increase in the volume of flood water is, however, due to the tributaries which rise in Ethiopia—the Sobat, Blue Nile, and Atbara. Ethiopia has heavy monsoon rains which swell all these rivers, but the Blue Nile is the chief cause of Nile floods. The Blue Nile rises in Lake Tana which lies high on the Ethiopian plateau and receives the summer rains (Fig. 12). The lake acts as a reservoir which prevents too rapid a run off of the water and prevents the river from drying up in winter. In June, the water carried by the Blue Nile causes the level of the White Nile to rise at Khartoum and, for a time, ponds up the waters south of the town. As the flood waters are carried northwards this temporary lake slowly drains. By October the flood has reached its peak at Cairo. The Blue Nile also carries much fertile silt from the Ethiopian Highlands which is deposited when the flood waters subside.

The Atbara also brings down extra water in summer but it becomes a series of pools during the dry winter. The Sobat contributes to the Nile floods in the White Nile basin, though

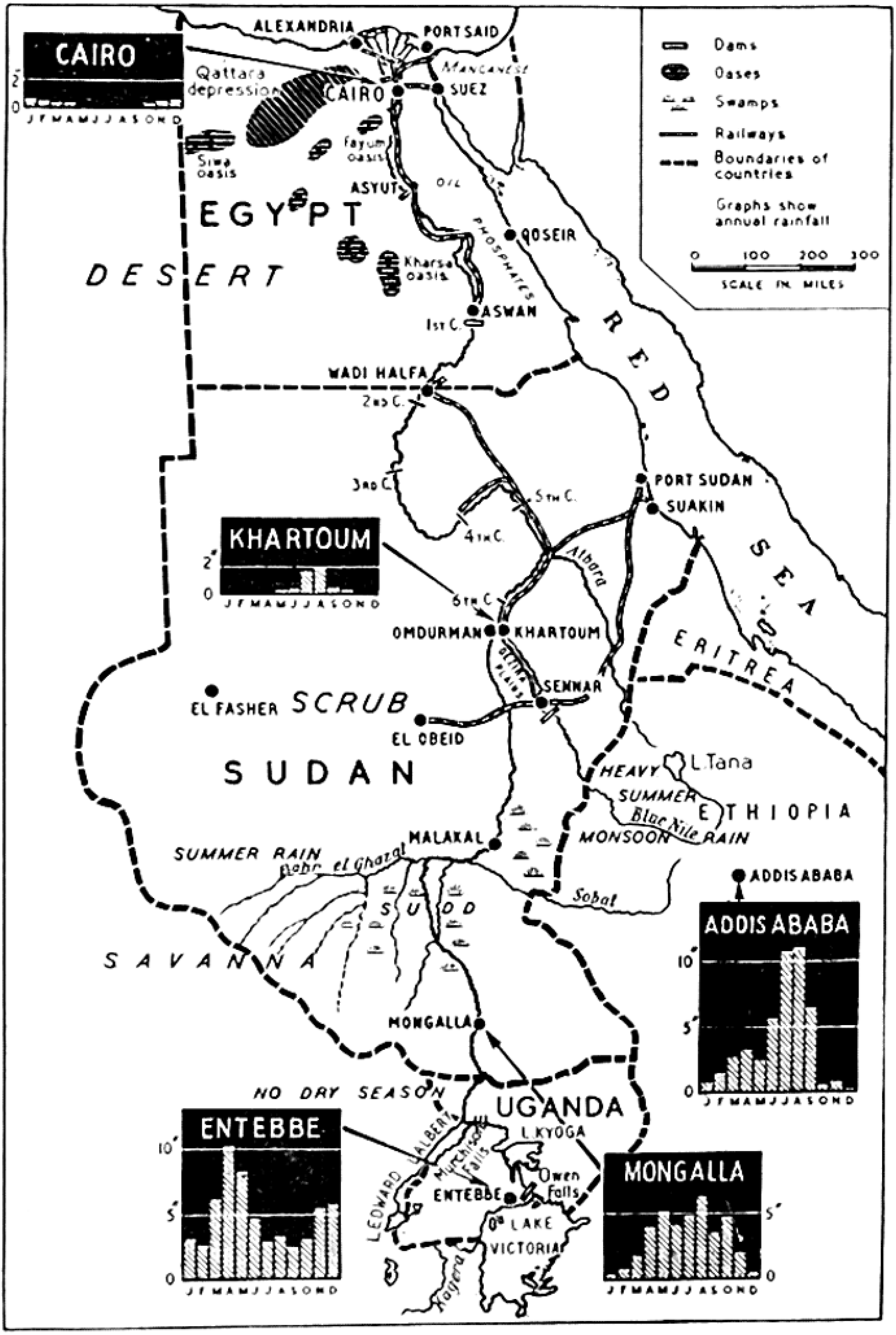


Fig. 12. The Nile Valley: Rainfall.

much of its water is lost by evaporation before it reaches the main stream. In summer it causes widespread inundation in the basin south of its junction with the White Nile.

### Control of the Nile Waters

Before the building of the Aswan Dam there was little or no control of the Nile floods. The flooded ground was useless until the waters subsided and valuable water was carried into the Mediterranean Sea. When the floods abated, valuable fertile silt was left on the land and the winter season was a very busy time for cultivation in the lower Nile valley. Many dams and barrages have been built to hold back the flood water during the summer and to regulate the supply of water needed by the farmers. In this way it is possible to cultivate the land throughout the year, although there is less silt available to fertilise the soil. The Aswan Dam was built in 1902 and has twice been raised to increase the amount of water held up behind it. A big problem arose as to how the vast amount of silt brought down by the Blue Nile floods could be prevented from filling up the storage tank behind the dam. To lessen this danger the sluice gates are kept open until most of the Blue Nile flood waters have passed downstream when they are closed to allow the lake to fill with clearer water. Smaller regulating dams such as the Delta Barrage, north of Cairo, have been built at various points along the river.

A new High Dam is now under construction four miles south of the original Aswan Dam. It will be completed in the 1970's and in due course will increase Egypt's cultivated area by 25 per cent. Cheap electric power will be made available for Egypt's new industries. The water held back by the dam will form a lake (Lake Nasser) some 300 miles long, stretching to the Sudan border. All-the-year-round navigation on the River Nile will be made possible.

In the Sudan, dams at Sennar and Roseires on the Blue Nile provide irrigation waters for the Gezira Plains (p. 46).

## EGYPT

Although Egypt is over three times the size of the British Isles, most of its twenty-seven million people live in a narrow strip of country which borders the Nile. This is made necessary because Egypt is an almost rainless country and depends on the Nile for water everywhere except in a few oases.

The lower Nile valley was inhabited by civilised people probably 6,000 years before the birth of Christ. These people were the forerunners of the Ancient Egyptians who began to rule about 4000 B.C. and developed a very high standard of culture. In those early days, people were influenced by their geographical environment far more than they are today. In the Nile valley they found a fertile strip of land watered by the river. By careful planning of the use of river water, abundant harvests could be obtained which provided plenty of food and yet gave them leisure in which to develop arts and all that goes to make a highly civilised community. The glories of Ancient Egypt are still to be seen in remains of temples, rich furniture found in tombs, and in the Pyramids. Such progress was only possible in time of peace and the ancient Eygptians were fortunate in that their geographical environment provided unique protection from marauding tribes. In southern Egypt the Nile valley is narrow and blocked by cataracts which gave protection; further north the fertile alluvial plain is flanked on both sides by miles of waterless desert—an almost impassable barrier for would-be invaders. Until man learnt to sail ships the sea also provided protection. Thus the early Egyptians were left in peace for some 4,000 years to develop agriculture and the arts with very few interruptions. Later, when man had learnt how to cross the sea, Egypt had a succession of invaders and the civilisation decayed.

Perhaps the most important event which brought Egypt into contact with the Western European powers was the cutting of the Suez Canal by the French engineer, Ferdinand de Lesseps, and its opening in 1869. Although originally opposed to the scheme, Britain soon realised its importance and gained control of the canal, and of Egypt, which then became a British Protectorate and remained so until 1922 when independence was granted, with certain rights of defence reserved to the British —particularly the defence of the Canal Zone. In 1953, the Army deposed the king and Egypt was declared a Republic. Three years later Egypt seized the canal and expelled British and French subjects from the country. In 1963 Egypt, Iraq, and Syria agreed to set up a Federal State to be known as the United Arab Republic.

## The People of Egypt

Before 1953, there was a great difference in the standard of living between the wealthy, upper classes of Egypt and the peasants. Since then there has been a redistribution of wealth and of land and the lot of the peasants has been improved, though many of them remain poor, living in villages of one-storied, flat-roofed, mud huts. Most of them are agriculturists who cultivate farms of one or two acres, using wooden ploughs drawn by oxen, donkeys, or camels.

## Agriculture

The land is fertile and there is abundant sunshine. Round the fields are irrigation ditches fed by Nile water. Much time is spent in raising this water to the level of the fields by primitive methods which have changed little since the time of the early Egyptians. The shadouf is widely used. It consists of a wooden lever by which a bucket may be lowered into the water and then raised to the field when full. Richer peasants use donkeys, or oxen, to work a water wheel, or sakeer, which turns round and brings up full buckets from the ditch or canal. Archimedes screws are also used. All these methods were used in Ancient Egypt.

In some areas the land is still irrigated by being covered by flood water during summer. This is known as basin irrigation and such areas only produce winter crops. Where the land receives its water from irrigation ditches crops may be grown in winter and summer. This is known as perennial irrigation. In such areas three to five crops a year may be obtained. To keep up fertility, fertilisers are needed and are used in large amounts. Farming is intensive and is based on small units; no one may own more than 100 acres. The most densely peopled rural area is in the Nile delta where there are well over 1,000 people per square mile. Since the floods have been controlled by dams and barrages much of the land is available for both summer and winter crops.

Cotton is the chief summer crop, most of which is exported. Indeed, so valuable is cotton to Egypt that it often takes the place of food crops and wheat has to be imported. Most of the cotton is grown in the Nile delta but it is also important in Upper Egypt. The crop is usually picked in July and August. Labour is cheap and abundant, so hand picking is the normal practice. The fibres are ginned and compressed into bales locally before they are sent to Alexandria for grading and export.

Egyptian cotton is liable to be attacked by "worm". The cotton worm moth lays its eggs on the cotton plants in June and the hungry caterpillars eat the leaves and destroy the plants. Thousands of children are employed to pick off the caterpillars but, despite this, there is a considerable loss from this cause every year.

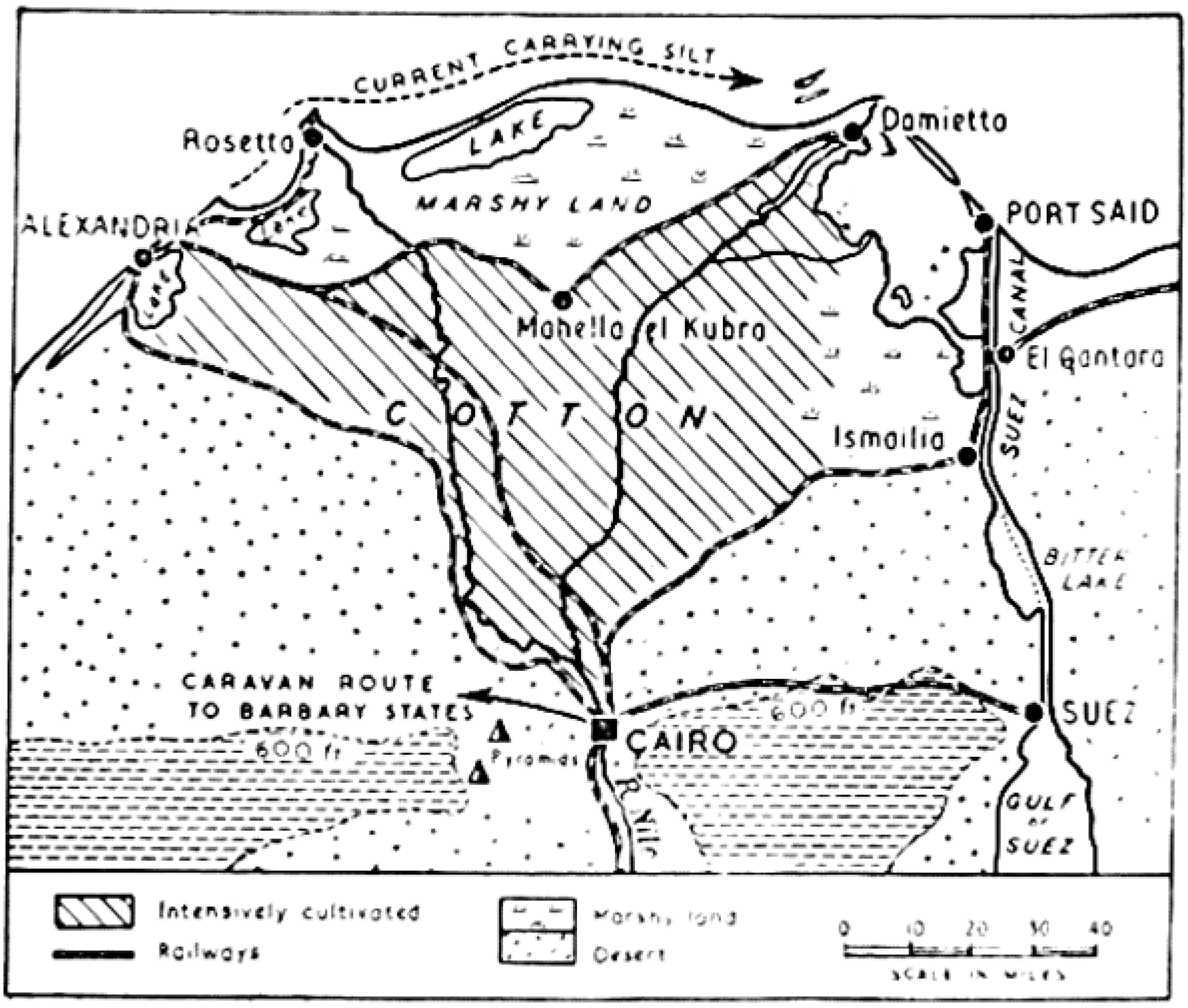


Fig. 13. THE NILE DELTA.

A variety of cotton with a long silky fibre is grown in the Nile delta. It is used in the manufacture of aircraft tyres and sewing cotton.

Other summer crops include maize, sorghum (used as fodder), rice, and sugar cane. Some rice is exported.

In winter, which is warm in Egypt (Cairo 12° C. or *54° F.* in January), wheat, barley, beans, lentils, onions, flax, and clover, are among the cultivated crops. Date palms flourish in the Nile valley and in the oases, providing useful food and fuel.

Pastoral farming is not important but water buffalo, oxen, donkeys, and camels are kept as drought animals. Goats and sheep are pastured on fallow land.

### Minerals

Egypt is not rich in minerals. Phosphates are obtained from the neighbourhood of Quseir (Kosseir) on the Red Sea coast. Egypt is one of the largest users of fertiliser in the world. Iron ore is mined in Upper Egypt and manganese in the Sinai Peninsula. Oilfields, near the Red Sea, produce nearly enough petroleum to supply Egypt's needs. Other minerals include salt, lead, zinc, soda and gypsum.

### Modern Trends

Three-fifths of Egypt's people are farmers, but farming is no longer sufficient to support the population which is increasing rapidly. The standard of life of the fellaheen is far too low and the Egyptian Government realises that something must be done to improve it. The following developments should help to solve the problem.

(*a*) The control of flood waters to increase crops, and to allow cultivation of crops throughout the year in those areas which use basin irrigation, *i.e.* are flooded for part of the year. Such measures will need even more extensive use of fertilisers such as phosphates and nitrates.

(*b*) The new High Dam which is being built at Aswan will create a reservoir of water and increase the irrigated land of Egypt by about one-quarter. Electricity will be generated for industrial development.

(*c*) The further development of industry which is already expanding. The chief industry is the manufacture of cotton textiles mainly centred on Alexandria, Mahalla el Kubra, and Cairo. Cotton by-products such as oil cake and soap are also made. There is an iron and steel plant at Helwân, south of Cairo, and many factories assemble cars, railway carriages, refrigerators, and radio and television sets from imported parts. Other industries include cigarette making, sugar refining, and the manufacture of leather goods, pottery, brass, copper ware, and cement. An Egyptian film industry produces films which are distributed throughout the Middle East and in South-east Asia.

(*d*) A plan to run Mediterranean water into the Qattara Depression west of Cairo (see Fig. 12, p. 36) which would provide hydro-electric power and make it possible to cultivate a large area, using underground water for irrigation.

(*e*) The encouragement of tourists.

### Transport

The Nile is a natural highway in Egypt. It is navigable throughout the country, the dam at Aswan being passed by locks. Shallow-draught river steamers operate regular services and there are many native craft with picturesque sails. In the Nile delta, railways are the chief means of transport, although canals and rivers carry some traffic. South of Cairo, a railway follows the valley as far as Shallah near Aswan, but beyond this point there is a gap which is bridged by a motor road to the northern terminus of the Sudan railway just south of the border. The Egyptian railway system is connected with Israel and Arabia by a line which crosses the Suez Canal.

### Chief Towns

*Cairo* (3,350,000) is the capital of Egypt, and the largest town in Africa. Situated where the narrow Nile valley opens out into the delta, it is in a good position to control both areas. An old caravan route from the Barbary States to Palestine also crossed the Nile at this point. Cairo is one of the world's most cosmopolitan cities. Many of its largest shops are owned by French, Italians, and Greeks, and nearly every race is represented among its inhabitants. It is an important centre of Islam with its fine mosques and Moslem University. Cairo Airport lies on the main air routes from Europe to India, and from Europe to South Africa.

*Alexandria* (1,515,000) is the chief port of Egypt, situated on the western seaward edge of the Nile delta where eastward flowing currents keep its harbour free from silt. It was founded by Alexander the Great in A.D. 332 and was for many years capital of Egypt. Its harbour is protected by an island (now linked to the mainland) and modern improvements have made it capable of dealing with most of Egypt's foreign trade. It is an important industrial town.

*Rosetta* and *Damietta* are smaller ports on the delta but they tend to become silted up.

*Aswan* (100,000) is the most important town in Upper Egypt. It is situated near the first cataract and it is near the Aswan Dams. The town has grown very rapidly and is expected to become a great industrial centre with iron and steel works.

## The Suez Canal

The Suez Canal was built by a French engineer, Ferdinand de Lesseps, and was opened in 1869. The territory through which it passes was leased by Egypt to a French company which managed the canal. In 1956 Egypt nationalised the company and took possession of its installations.

The canal is an important trade route between Western Europe and the Middle and Far East. It is a vital link for Britain since most of Britain's crude oil comes from the fields of the Middle East, the greater part of it via Suez. Until the canal was cut the Cape route was the nearest sea route from Britain to India. By using the Suez Canal about 4,000 miles is saved on this journey. The voyage from Melbourne to London is also shortened by 1,000 miles. Since the canal has been in Egyptian hands it has been widened and deepened; two way traffic is now possible throughout its length.

The Suez Canal is open to ships of all nations except Israel. Oil tankers account for much of the north-bound traffic and the largest tonnage of shipping is British. Next in importance come Norway, Liberia, France, Italy, and Greece.

*Port Said* (244,000) is a port and fuelling station for ships at the northern entrance to the Suez Canal. It deals with a small amount of Egypt's foreign trade and has a ship repair works.

*Suez* (203,000), at the southern entrance, is less important. It has oil refineries and supplies fuel oil to shipping.

Both Port Said and Suez are connected by rail with Cairo.

**The Trade of Egypt**

Cotton and cotton yarn make up over two-thirds of the exports, with rice next on the list. The U.S.S.R. is Egypt's best customer, buying much of her cotton.

Egypt imports machinery, wheat, fertilizers, motor vehicles, and aircraft. The U.S.A., the U.S.S.R., West Germany, Italy, and Britain supply most of her imports.

All trade in Egypt is under government control.

## THE SUDAN

The Sudan is a land of contrasts. The north differs greatly from the south—in climate, vegetation, race, religion, language, and in occupations. Of the total population of about 13 million, nearly four-fifths live in Northern Sudan. They have Arab blood and produce the main government leaders. The seat of Government at Khartoum is in the Northern Sudan.

The Southern Sudan lies south of latitude 14° N. and is inhabited by negroes of many different tribes, speaking many different languages and dialects. Most of them know little of the world beyond their own domain. Civilisation has penetrated slowly, partly because much of the country is swampy and inaccessible, and also because the climate is unsuitable for white settlement.

The government of a country so diverse in character presents special problems. The Sudan was for many years administered jointly by Britain and Egypt under a British Governor General, but became an independent republic in 1956. After a short period of parliamentary government, control of the country was taken over by the Army.

Unfortunately the people of the south distrust the people of the north. They still find it difficult to forget that the slave trade under which their forebears suffered was carried on by people from the north. Moreover, they are outnumbered and have little influence since most Government officials are northerners. One of the main problems of the Sudan is the creation of a united nation.

Most of the time, however, the people of the south are content to go their own way. Cattle are the mainstay of their lives and their chief source of wealth; their cattle are seldom killed for food but are cherished almost more than human beings. The country in which these tribes live lies in the savanna where rain falls mostly in summer and where large areas of the White Nile basin (Fig. 12) are flooded at this season. During the rains, the tribes live in small villages of mud huts, one large hut being reserved for the cattle and the young men who look after them. In the dry season, the cattle are driven to fresh grazing grounds and the tribe lives in temporary grass huts. This is the season for fishing in the rivers. The fish are cut up and dried for use during the rainy season before the crops are ripened. The women are the agriculturists who cultivate crops of millet—the staple food. In the forested area of the south-west an experiment to try to raise the standard of living has been started—the Zanoi Scheme. Trees have been cleared, and roads, houses, schools, and hospitals built. Cotton, sugar, and other crops are grown by the native people under government supervision. A modern textile mill provides cloth for local needs.

## Climate and Natural Vegetation

Since the Sudan stretches through about fourteen degrees of latitude there is considerable variety in climate and natural vegetation. In the extreme south the climate is equatorial. Rubber trees grow wild in the tropical forests of the Congo-Nile watershed but very little is collected. Northwards, where the rainfall decreases and is restricted to the summer, forests give place to savanna. The great marshy basin of the White Nile is situated in the savanna belt. Further north, with a lessening rainfall, savanna merges into scrub with poor grass and thorny trees. North of latitude 15° N. vegetation is sparse and gives place to the wastes of the Libyan Desert.

## Economic Products

Cotton is by far the most important export of the Sudan, producing about three-fifths of the country's wealth. Most of the crop is grown on irrigated plantations in the Gezira Plains (Fig. 14) where the Sennar Dam on the Blue Nile stores up the necessary water. Cotton is also grown near Kassala, and near Tokar on the deltas of streams which rise in Ethiopia and lose themselves in the desert. The flood waters of these streams are used for irrigation. In all these areas mainly long-staple cotton is grown. Rain-grown cotton is cultivated in many parts of the savanna belt where the rainfall is more than 20 in. per annum, but the combined production from these areas is relatively small. Almost all the raw cotton and cotton seed is bought by Great Britain.

Ground nuts grow well in the Gezira and are proving to be a profitable crop.

The Sudan is the chief world source of gum arabic which is one of the major exports. The gum is obtained by tapping varieties of acacia tree which grow in the thorn scrub belt. Liquid oozes from the trees and hardens on the branches from which it is collected. The district round El Obeid is the chief producing area. Gum arabic is used in medicine, in confectionery, and in the textile industry to give a glossy finish to the woven cloth.

The Southern Sudan is developing steadily as an agricultural region. Rice is grown to provide food locally and coffee, tea, and tobacco are sent north.

Other products include sugar, wheat, millet, hides, beans, shea nuts (from the savanna belt and irrigated areas), salt and dates (from the desert), and elephant tusks and mahogany from the south.

There are many cattle, sheep, and goats, in the Sudan; live animals are sold to Egypt and hides are exported. There is a modern meat factory at Kosti. Camels are reared in Northern Sudan and form an item of trade with Egypt.

There is considerable mineral wealth as yet scarcely tapped, although some manganese, chromite, and salt (from salt pans near Port Sudan) are exported and some mica is mined.

### Towns and Communications

*Khartoum* (178,000), the capital, is situated at the junction of the Blue Nile and the White Nile. It is the seat of the Sudan Government and the chief educational centre. A railway links the town with the Red Sea coast. Khartoum has a growing industrial area and an important airport used by many European airlines. On the opposite bank of the Nile is the town of *Omdurman* (152,000) where mud-brick houses form a striking contrast to the modern buildings of Khartoum.

*El Obeid* (60,000) is a market centre for gum arabic, sheep, and cattle. Many routes converge on the town and a railway via Sennar links it with Port Sudan.

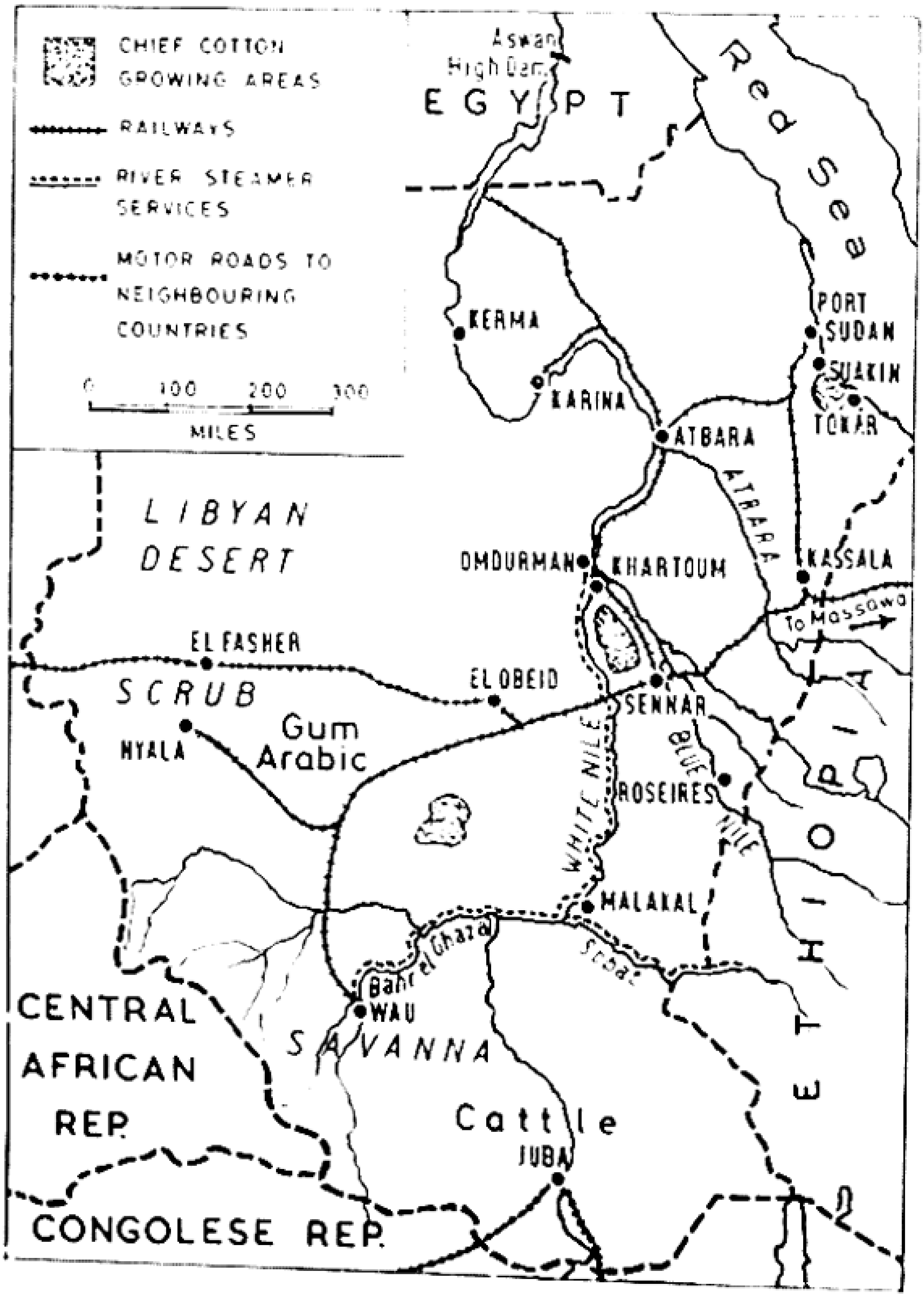


Fig. 14. THE SUDAN.

*Port Sudan* on the Red Sea coast is the chief port. It has a protected natural harbour and is connected by rail with all the important producing areas of the Sudan.

*Malakal*, a small town on the Nile, on the edge of the White Nile swamps, is growing in importance. It now has a hospital and a station from which serum is obtained from cattle.

Steamers ply between Khartoum and Juba from which point motor roads connect with the Congolese Republic and Uganda.

### Trade

The most important exports are ginned cotton, gum arabic, and groundnuts. Britain is the chief customer but Germany and Italy also buy freely.

The chief imports are machinery, motor vehicles, cotton piece goods, metals, sugar, and tea.

# CHAPTER IV

## WEST AFRICA AND THE CONGO BASIN

West Africa stretches northwards from the Gulf of Guinea to the Barbary States but only that part which lies south of latitude 15° N. is economically important. Except for the small areas occupied by Portuguese Guinea and the independent negro state of Liberia, West Africa has strong links with Britain and France.

### The People

The people of West Africa are mainly negro, ranging from primitive tribes in the coastal forests to highly educated negroes who have had university and technical training abroad, or in their own country. Before the advent of Europeans, many tribes practised crafts of weaving, pottery, metal working, and carving, and they carried on a good deal of trading from their native-built towns. Much trade was done with the Arabs of the Sudan whose influence is very noticeable in the northern districts of West Africa, where many negroes have adopted Arab dress and belong to the Moslem faith. In the fifteenth century, the Portuguese explored the coast and established trading stations, but little was known of the interior until Mungo Park explored the Niger in the nineteenth century.

The modern development of West Africa belongs mainly to the twentieth century. The climate makes it unsuitable for permanent white settlement and the racial problems which are important issues in the Republic of South Africa do not exist in West Africa. The chief social problem is that which arises from the superior attitude of some of the educated Africans, most of whom are clerks and officials in the towns, who tend to look down on their less educated brethren in the country districts.

In recent years great changes have taken place in the government of former British and French colonies in West Africa. Ghana, Nigeria, and Sierra Leone, and Gambia have become independent countries within the British Commonwealth and all the former French colonies are now self-governing.

Economic development in West Africa offers wide contrasts, ranging from primitive peasant farming to modern scientific agriculture. Nigeria, Ghana, and Senegal, are the most advanced countries.

### Physical Features

The Niger Basin occupies the greater part of West Africa. This great river rises in the Futa Jallon Highlands and flows inland into a basin almost surrounded by hills, the highest parts of which are the Futa Jallon Highlands and the Bauchi Plateau. Above Timbuktu, the braided streams of the Niger, which form a lake during the summer floods, are remnants of waters which once formed an inland drainage basin similar to that of Lake Chad. The Niger, Senegal, Gambia, and Volta rivers all rise on the inner side of the basin and break through the rim, thus draining the area to the sea. Where the Niger breaks through, between Niamey and Jebba, the river is only navigable for small river craft. The river is thus divided into two main navigable sections:—

(*a*) Kurussa to Niamey, (*b*) Jebba to the delta.

The Upper Niger is also navigable some distance above Bamako. The Benue, the largest tributary of the Niger, is navigable in its lower course in the wet season. Many swift streams drain the seaward edge of the highlands, often ending in shallow lagoons or sand-silted creeks which are a feature of the Guinea coast. There are no good natural harbours on the Gulf of Guinea owing to shifting sand-bars and shallow water which produce surf off shore. The Niger delta is a large mangrove swamp threaded by a maze of small shallow streams.

The west coast has numerous estuaries, often blocked by sand-bars, but that on which Freetown is situated forms a fine natural harbour.

### Climate

West Africa, lying between the Tropics, never experiences low temperatures, the average annual temperature for most

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parts being 27° C. (*80° F.*) The average annual temperature of the Guinea coast is a little lower owing to the cool Canaries Current off shore. Annual and daily ranges of temperature increase inland:—

| | Hottest Month | Coolest Month | Annual Range |
|---|---|---|---|
| Lagos .. | 28° C. (*82° F.*) | 24° C. (*76° F.*) | 3 C°. (*6 F°.*) |
| Timbuktu .. | 35° C. (*95° F.*) | 22° C. (*72° F.*) | 13 C°. (*23 F.°*) |

Since the sun is overhead twice a year, mean monthly temperatures show two maxima everywhere in West Africa.

The rainfall is chiefly derived from the south-west summer monsoon. The winter winds of the Gulf of Guinea are also south-westerly but they are weaker than those experienced in summer. Elsewhere, dry, north-east winds prevail in winter. The heaviest rainfall occurs on the seaward side of the highlands and reaches nearly 200 in. in Guinea, and over 170 in. in the Niger delta. There is, however, a remarkably low rainfall on the coast of Ghana between Takoradi and the Nigerian border where the amount received is less than 30 in., although some fifty miles inland over 50 in. of rain falls annually. The reason for this low rainfall is obscure. It has been suggested that the presence of cool waters off shore, and the fact that the south-west winds blow nearly parallel to the coast, are likely causes.

The Harmattan is a dry east or north-east wind which blows from the Sahara Desert in winter. It frequently blows in the north and may even penetrate as far as the Guinea coast when its dryness reduces the humidity and thus produces a relief from the steamy heat so characteristic of this region. Because of its invigorating effect, it has been called "the doctor".

### Seasonal Rainfall and Vegetation

Apart from the dry area of Ghana, the coastal regions south from Sierra Leone experience an equatorial climate with high humidity. The natural vegetation is dense, tropical, rain forest with mangrove swamps on the coast. These forests contain many hardwoods, such as mahogany, which forms a considerable export from Nigeria, Ghana, and Sierra Leone. The industry is hindered by the dense growth of the forest, and the fact that there are no big stands of any one species of tree. Wild rubber also grows in the forests but is of little importance. The chief economic products are palm oil, kola nuts, and cocoa (from the cacao tree) which was introduced into West Africa from South America by the Portuguese. Palm oil and kernels are among the chief exports of Nigeria and Sierra Leone, and are of considerable importance in Ghana and the Ivory Coast. Cocoa forms the chief export of Ghana, and is also important in Nigeria.

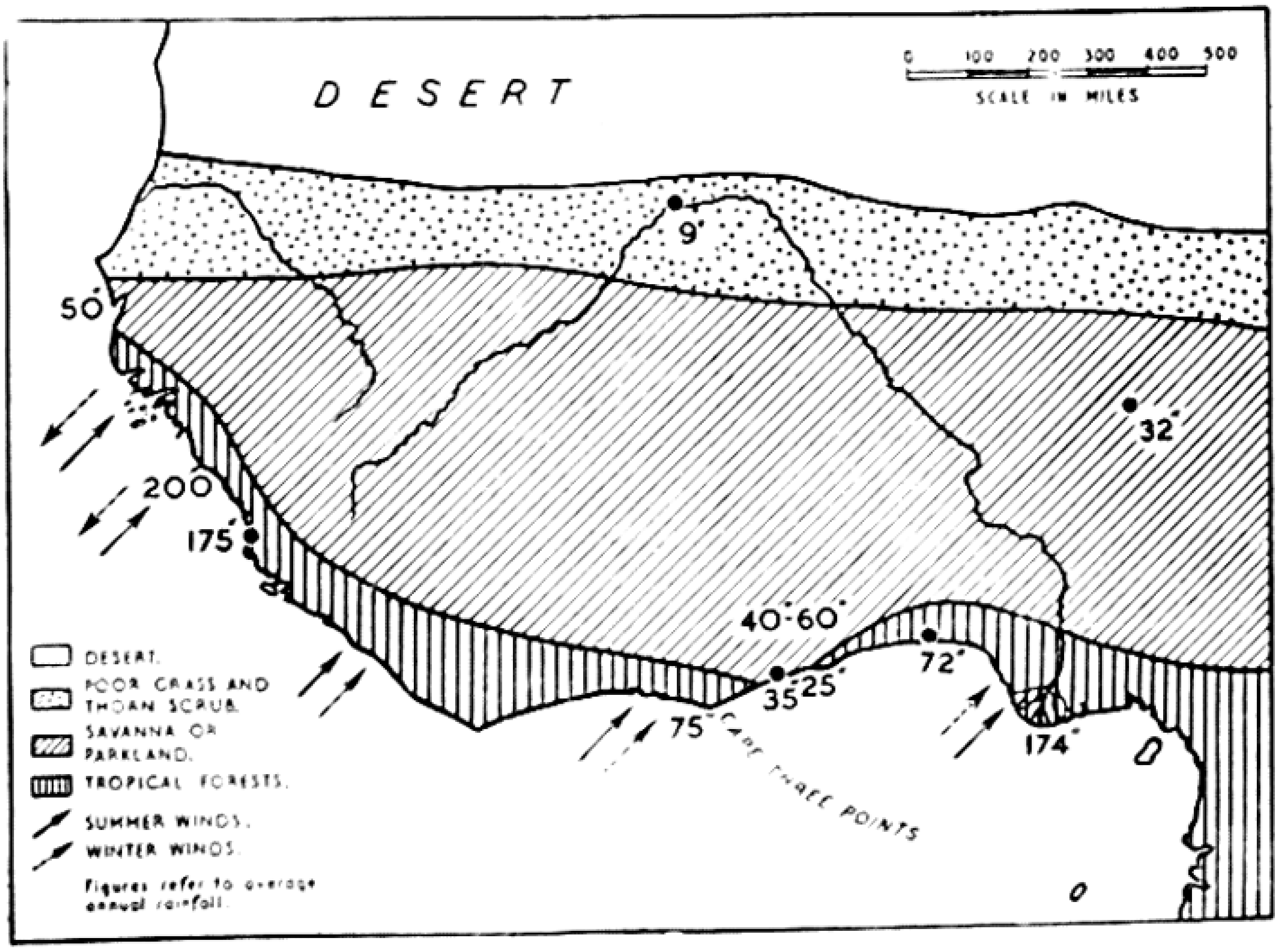


Fig. 15. WEST AFRICA: VEGETATION.

Food crops include rice, yams, sweet potatoes, plantains, and coconuts, which are widely grown near the coast. To the north, where the rain decreases, and falls mostly in summer, forests merge into parklands and tropical grasslands where many native cattle graze. Here, the chief food crops are millet, maize (Guinea corn), and groundnuts. Cotton has been grown for many years by the negroes and woven on primitive looms.

By far the most important economic crop of the savannas is groundnuts. Senegal is the largest producer but they form an important part of the exports of Nigeria and Gambia. The shea butter tree, the nuts of which yield oil used by the natives, grows wild in the savannas in most parts.

North of the savannas, where the rainfall is low, and the dry season long, the natural vegetation is thorn scrub and poor grass which supports a few sheep and goats. Except where irrigation is possible, as in Mali near the Niger, agriculture is not important. In some places gum arabic is obtained from the wild acacia trees. North of Timbuktu the thorn scrub merges into the Sahara Desert.

### The Locust Scourge

The semi-desert area near Timbuktu is one of the breeding grounds for locusts. Other African breeding places are the Sahara, and the shores of the Red Sea. Flying swarms of locusts invade most African countries. and do an immense amount of damage by devouring grass and growing crops. So much destruction and famine has been caused by these pests that scientists have studied their habits and discovered their chief breeding grounds.

Locusts lead a double life. Sometimes they are ordinary, harmless, green grasshoppers. At other times they become destructive swarms of locusts, different in habits and appearance from the harmless grasshopper. Overcrowding was found to be the cause of this change. After heavy rains and floods, such as occur on the Middle Niger, grass grows plentifully and grasshoppers breed in great numbers. Drought then follows, the grass dries up, and there is not enough food for the great numbers of insects. This is the situation responsible for the change. New hoppers hatch from eggs but these are larger, and different in colour from the grasshoppers, and soon turn into locusts which fly away to other areas in dense swarms. They settle on any green growth in their path and proceed to devour it. When they find a suitable place, eggs are laid and locust hoppers hatch out in millions and eat every green growth available. These eventually form more swarms which fly off and continue the destruction.

Organised observation of the route followed by locust swarms is now being made by the Anti-locust Campaign. Where possible, poison bait is placed in their path, but although this destroys millions, many survive. The most effective plan is to poison the locust hoppers in their breeding grounds, but this is very difficult since they usually breed in inaccessible deserts where there are few roads, so that poison has to be taken many miles over difficult country. Millions of pounds have already been spent on this work and much has been achieved to control the pest, but much still remains to be done.

## BRITAIN AND WEST AFRICA

### THE FEDERATION OF NIGERIA

Nigeria, a Republic within the British Commonwealth, is the largest country in West Africa. It extends from tropical rain forests in the south, across the savanna to the southern edge of the Sahara Desert. Nigeria, with a population of nearly sixty million, is one of the most densely-peopled parts of Africa.

The Federation of Nigeria consists of four regions:—

(i) The Western Region with its capital at *Ibadan.* Two-thirds of the people are Yoruba. The Federal Capital, *Lagos*, is detached from the Western Region on the coast.

(ii) The Mid-west Region. Capital *Benin City.*

(iii) The Eastern Region is the most densely populated. Two-thirds of its people belong to the Ibo tribe. The capital is *Enugu.*

(iv) The Northern Region which is the largest and contains more than half of Nigeria's population. It has a long Moslem tradition. The capital is *Kaduna.* The highest land in Nigeria, the Bauchi Plateau, lies to the south-east of Kaduna.

Each region has its own regional government. The Federal Government meets in Lagos.

Nigeria also includes a narrow strip on the eastern border of the Northern Region which was formerly part of the trusteeship territory of the Cameroons.

**Agricultural Products**

Palm oil and palm kernels are a very important part of Nigeria's economy. The oil palm grows wild within 150 miles of the coast, where the rainfall exceeds 60 in. per annum. About five or six bunches of fruit are borne at the top of each tree. After picking, the fruits are boiled in water. As soon as they are soft they are emptied into tubs and pounded until the pulp is separated from the kernels. After the kernels have been removed, women squeeze out the oil from the pulp and pour it into tins. The stones also are cracked, the kernels extracted and sent, as they are, to the importing country where the oil is extracted by modern methods. Modern factory methods give more oil, and better quality oil, than the hand-pressing methods and some small factories have now been set up in Nigeria. Palm oil is an important item in the African's diet, but much is exported for the manufacture of soap and candles, as a lubricant, and for use in the tin-plate industry. Palm kernel oil is also used in margarine. Formerly, the world's need for palm oil was supplied almost entirely from Nigeria but there is now competition from Malaya, Indonesia, and the Congo.

Cocoa provides the chief export, much of it produced on small native holdings in the neighbourhood of Ibadan.

Rubber plantations provide the chief export of the Mid-west Region.

Nigeria has an important hardwood industry. There is a large sawmill and plywood factory at *Sapele*, a timber port on the western edge of the Niger delta, where the hardwoods are sawn into planks for export (see plate facing p. 76).

A dam is to be built on the River Niger about fifty miles north of Jebba to provide electricity and water for irrigation projects in the Niger valley.

Two important savanna products are groundnuts and cotton. Groundnuts are grown on the Bauchi plateau, near Kano, and also near the Niger and Benue rivers. Cotton has long been grown by native Africans on the Bauchi plateau and near Ibadan. A cotton mill at Kaduna in Northern Nigeria uses the local raw material for making cloth.

Hides from native cattle are a considerable export. Attention is being paid to the improvement of the native breeds by

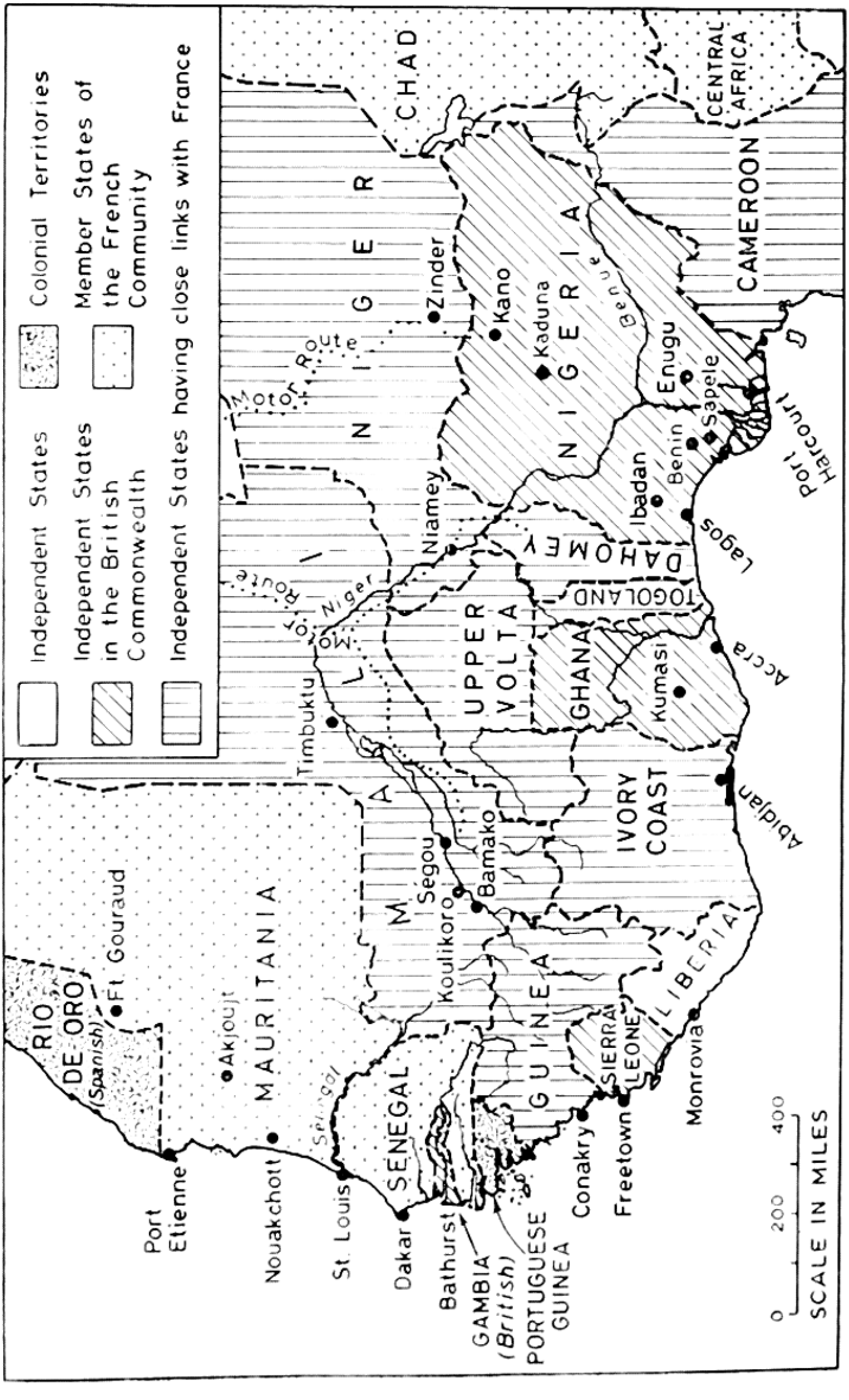


FIG. 16. THE COUNTRIES OF WEST AFRICA.

introducing zebu stock which are less prone to disease than cattle from Europe. Since many Africans count their wealth in cattle, the emphasis tends to be on quantity rather than quality, so improvements to the herds can only be made slowly. The tsetse fly which carries sleeping sickness is also a hindrance. Although a little milk and butter is produced from improved herds, most of the cattle are used as draught animals and yield only hides for export.

### Minerals

The chief minerals of Nigeria are coal, oil, and tin. A coalfield near Enugu is linked by rail with Port Harcourt, and most of the coal is used on the railways or for fuelling ships.

Tin occurs in veins in the granite rocks of the Bauchi plateau. Most of the mining is alluvial, and much of the tin ore goes to South Wales. Associated with the tin is the mineral columbite which is in great demand for making the steel used in the manufacture of jet engines for aircraft. Nigeria supplies most of the world demand.

Oil from Oloibiri is taken by pipeline to Port Harcourt to be refined. Oil has also been found in the Western Region. Natural gas is obtained from the oilfields.

### Towns

*Lagos* (675,000), the Federal capital and chief port of Nigeria, is growing rapidly with the expansion of industry. It has a large airport. A Lagos factory makes rubber tyres.

*Port Harcourt* (72,000) is the second port, serving the Enugu coalfield and the Oloibiri oilfield. It has an aluminium rolling mill and an oil refinery.

*Ibadan* (600,000), the capital of the Western Region, is the most important of the inland towns. It has many markets, and is a great centre for native crafts, especially cloth weaving and dyeing. Most of the city is like a vast overgrown village, but large modern buildings are springing up, including a University College for students of science, agriculture, and medicine.

*Kano* (130,000) is an old African town on the northern plateau. For many years it has served as an entrepôt for trade between West Africa and the Sahara. The town, surrounded by fourteen miles of wall, is mainly built of mud-brick houses. It has native industries, especially the weaving of cotton cloth which is an important article of trade with the Arabs. Kano has rail connection with Lagos and Port Harcourt, and is linked by a trans-Saharan motor route with Algeria. It has a modern airport which is increasing in importance.

*Kaduna* is the capital of the Northern Region, *Benin City* of the Mid-west Region, and *Enugu* of the Eastern Region.

### Trade

Nigeria's external trade is chiefly with Great Britain. The chief exports are cocoa, groundnuts, palm oil and palm kernels, rubber, timber, hides, coal, and tin ore.

The chief imports are machinery, and cotton piece goods.

There is a thriving internal trade. Cattle, meat, groundnuts, and grain move from north to south; fruit, palm oil, and kola nuts move from south to north.

## GHANA

Ghana consists mainly of the basin of the Volta river. Only the extreme south-west coastal areas have tropical forests; the rest of the coastal lowlands are savanna. Inland, as the land rises, the rain increases, and forests clothe the wetter seaward slopes of the hills. North of the highlands, savanna conditions prevail.

Ghana (formerly the British colony of the Gold Coast) gained full independence in 1957 to become the first all-African state in the British Commonwealth, with a population of about seven million. In 1960 it became a republic but it remains in the Commonwealth. It consists of five main Regions—the Eastern and Western Regions, Ashanti, the Northern Region, and Togoland.

### Chief Products

*Cocoa* is the chief export of Ghana and production is increasing. It is grown entirely on small holdings of from 2 to 6 acres. The tree was introduced in 1879 when an

African brought some seedlings from the island of Fernando Po in the Gulf of Guinea. In 1891 the first shipment of eighty pounds was sent abroad. In 1963 the value of cocoa exported was over £68 million. Ghana produces more than one-third of the world's cocoa.

Cocoa needs a hot, wet climate throughout the year, and is usually cultivated at altitudes less than 600 ft above sea level. The seed is planted on land that has been cleared of forest, except for scattered trees which are left to shade the growing plant. Mature cocoa trees are about the size of apple trees and have dark-green leaves. Small flowers are borne directly from the trunk and branches. Dry winds, such as the harmattan (p. 7), can do great damage by withering the flowers. The flowers are followed by bright yellow pods from 7 to 12 in. long. Each pod contains 30 to 40 beans embedded in white pulp. The crop is harvested twice a year by cutting off the pods which are then split open and the pulp-covered beans are scooped out. They are then placed in heaps and frequently stirred for about a week. During this period, heat is generated by the damp beans which ferment and become brown. They are then ready to be taken to market where they are bought by foreign cocoa firms for shipment abroad. Most of the marketing is done by a Cocoa Marketing Board.

Cocoa is produced south of the highlands, particularly around Kumasi. It has largely displaced the cultivated oil palm; the export of palm oil and kernels is now quite small.

Hardwood timber, mainly from the forests of Ashanti, provides a major export. It is sent away through Takoradi.

Along the coast coconuts are increasing in importance. They are not only an item of local food, but furnish copra for export. The coastal areas also produce several kinds of fruit. Bananas provide a considerable internal trade. Citrus fruits are also grown, many oranges being sold within the country. Limes are cultivated near Cape Coast and lime juice is made from them.

Kola nuts, which grow in the southern part of the country, are articles of internal trade in most parts of West Africa. They are said to give powers of endurance and are in great demand. Food crops include yams, cassava, plantains, and rice, the production of which has increased in recent years.

All the products so far described are produced mainly in the country south of the highlands. To the north, the farmers are mainly concerned with growing food—millet, maize, cassava, and groundnuts. Shea butter nuts grow widely in this area and are traded locally. Some cotton is also cultivated. The chief occupation is pastoral farming, since the area is free from tsetse fly. Herds of native humped cattle, together with goats and sheep, provide hides and skins for export.

### Minerals

The chief minerals, in order of export value, are gold, diamonds, manganese, and bauxite. Gold is the most valuable export after cocoa. It is mined by modern machinery. Ghana is third in the world for the production of high-grade manganese—after the U.S.S.R. and India. Diamonds are obtained from alluvial workings and the annual value of the exported stones is about eight million pounds. Bauxite, an earthy deposit which results from the weathering of crystalline rocks under tropical conditions, is the raw material for the production of aluminium. In due course, water held back by a dam on the Volta River at Akosombo will produce the largest artificial lake in Africa. Electricity will be generated for Ghana's developing industries including the aluminium smelter at Tema.

### Towns

*Accra* (492,000), the capital, is the largest town and the chief administrative centre.

*Tema*, a little east of Accra, handles cocoa and aluminium exports. Its harbour is protected by long breakwaters. It has an oil refinery and aluminium smelter.

*Takoradi*, a few miles from *Sekondi*, has a good modern harbour for ocean vessels. Minerals are among the exports.

*Kumasi* (190,500), the chief inland town, lies in the heart of the cocoa country. It is the capital of Ashanti and an important railway and road centre, with many large sawmills.

*Tamale* (49,000), the only town of importance in the north, is a road centre and deals with the administration of the Northern Territories.

### Trade

The chief exports of Ghana are cocoa, timber, gold, diamonds, manganese ore, bauxite, and palm kernels. Great Britain is the chief importer, but the U.S.A., and Western Germany are also important customers.

Imports include cotton textiles, machinery, and vehicles—mainly from Britain. Trade with Europe is increasing.

## SIERRA LEONE

Freetown is the best natural harbour in West Africa and was used by British sailors as early as the sixteenth century. In 1787 some four hundred freed slaves were settled there, and in 1808 it became a Crown Colony. Later it was incorporated in an area more than a hundred times as large—the Protectorate of Sierra Leone which became independent in 1961.

The descendents of the freed slaves—some 50,000 of them—are known as Creoles. The hinterland contains 2⅓ million native Africans belonging to about a dozen tribes. These two groups have now to be welded into a united nation.

From a low, swampy coast fringed with sand-bars, the land rises inland to the Futa Jallon Plateau from which many short rivers flow into silted-up creeks and estuaries. The River Rokelle, with a fine open estuary at Freetown, is an exception.

### Climate

The coastal area of Sierra Leone has a high rainfall which falls mostly in summer when south-west winds prevail. The mean monthly temperature and rainfall figures for Freetown are as follows:—

| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Temp. in ° C. | 27 | 28 | 28 | 28 | 28 | 27 | 25 | 25 | 26 | 27 | 27 | 27 |
| Temp. in ° *F.* | *81* | *82* | *82* | *82* | *82* | *80* | *77* | *77* | *79* | *80* | *80* | *81* |
| Rainfall in inches. | 1 | ½ | 1 | 5 | 15 | 21 | 37 | 40 | 33 | 15 | 5 | 1 |

### Products

The hot, humid coast is fringed with mangrove swamps behind which are dense tropical forests. Although there has been much wasteful felling of trees, timber is important in the south-east where a well-equipped sawmill for making furniture is working at Kenema, on the main railway.

The chief agricultural export of Sierra Leone is palm kernels. Many palm trees grow wild, but the native tree does not yield much oil since the outer, fleshy portion, from which palm oil is obtained, is thin. The Government has introduced better varieties of palm oil tree but the industry still needs more plantations of good trees, and better methods for extracting the oil (cf. Nigeria, p. 55). The Sierra Leone Marketing Board now operates several oil mills for expressing the oil. Kola nuts, from both wild and cultivated trees, form an important item of internal trade; many are exported to Gambia.

Rice, the staple diet of the African in the coastal districts of Sierra Leone, is grown in the hot, swampy lowlands, while upland varieties are cultivated in the interior. Other crops of the wetter lowland areas are cocoa, yams, sweet potatoes, bananas, and citrus fruits. Coconuts are cultivated on sandy soils near the coast. The highland areas are savanna. In many areas the tsetse fly restricts cattle rearing but goats are numerous. Millet, maize, groundnuts, and upland rice are the food crops of the drier areas, and some ginger is grown for export.

### Minerals

There are rich diamond fields in the east of Sierra Leone—at Kono, and along the eastern border. The authorities find it difficult to prevent the smuggling of diamonds into Liberia but, despite this, diamonds are the most valuable export. Iron ore is dug from open-cast workings, and chrome ore, platinum, and gold are also obtained.

### Towns

*Freetown* (130,000), the capital and chief port, has an important strategic position on the best natural harbour in West

Africa. It is situated on the estuary of the Rokelle river which is navigable in its lower course, and is the terminus of the main railway which runs to the Liberian frontier.

*Pepel*, on the Rokelle estuary opposite Freetown, is also the terminus of a short railway which serves the iron mines.

*Bo*, the largest inland city is linked with Freetown by railway.

### Trade

The chief exports of Sierra Leone are diamonds, iron ore, and palm kernels. Of less importance are coffee, cocoa, and kola nuts. Imports include cotton fabrics, fuel oil, vehicles, machinery, and rice.

## GAMBIA

Gambia is a narrow strip of country stretching about six miles from either bank of the lower Gambia River. In the estuary of the Gambia river are islands which were used by the British as trading centres in the seventeenth century. On one of these islands the town of Bathurst was built. These islands, together with the neighbouring coastal area, became Gambia Colony. By an agreement with the French, about 230 miles of the valley eastward from the colony was ceded to Britain and became the Gambia Protectorate. In 1965 the colony and protectorate became a self-governing country within the British Commonwealth, and in 1966 a republic.

Gambia has a population of about 330,000. The country is divided into a number of relatively small areas, each under a local chief, with an intimate knowledge of the resources and problems of his particular territory. A few British Government officers work closely with the chiefs in the administration of the country.

In the wet season, from June to October, the climate is hot and unpleasant. Near the river, the natural vegetation is forest and swamp; elsewhere there is savanna.

Gambia is a one-crop country; nine-tenths of the exports consist of groundnuts. This plant is a member of the pea family. It grows about one foot in height and bears yellow flowers on its lower branches which are followed by pods bearing two seeds or "nuts". From a part of the flower just under the pod grows a thick stalk which pushes the pod underground where it ripens. It is therefore essential the soil should be light, and the sandy soils of Senegal are well suited to groundnuts. The crop is lifted and the "nuts" extracted from the pods. There are no large groundnut plantations or estates. The nuts are produced by native Africans in Gambia, and are transported to the coast down the Gambia River. So great is the importance of groundnuts in the trade of Gambia that they are often grown at the expense of food which has to be imported. The chief food crops are rice, millet, maize, and cassava. Cattle are reared in the savanna districts.

Gambia has few minerals and little industry, but a compound of iron and titanium is mined for export to Britain.

### Transport and Trade

*Bathurst* (40,000) is the chief port and administrative centre. The harbour can take large vessels, and smaller ocean-going ships can use the river for about 160 miles, beyond which limit navigation is possible for river boats as far as the border with French territory. Gambia has no railway and depends largely on the river for transport.

Groundnuts make up the bulk of the exports. Imports included cotton textiles, machinery, sugar, and rice.

## FRANCE AND WEST AFRICA

Until 1958, French West Africa extended through over twenty degrees of latitude, from the Gulf of Guinea to the borders of Algeria—an immense area ruled completely from Paris. When Charles de Gaulle came to power in France he offered a choice to all the French territories, except Algeria. They could have self-government and become members of the French Community (much as Nigeria and Ghana have become independent countries within the British Commonwealth), or they could become fully independent, retaining less formal links with France.

Slowly the new states began to emerge. Only two French colonies in West Africa chose to become member states of the French Community—Senegal and Mauritania. Mali, Upper Volta, the Ivory Coast, Dahomey, Togo, and Niger decided on complete independence, restricting their links with France to mutual agreements on questions of economic development and trade.

## SENEGAL

Senegal extends inland from the West Coast of Africa on either side of Gambia and is separated from Mauritania to the north by the Senegal River. It is mainly savanna country, with a population of nearly 3¼ million, including many Frenchmen who live mainly in Dakar, the capital.

Groundnuts form the staple crop of Senegal. Many are consumed locally, but there is a large surplus for export. There is a large oil extracting plant at Dakar, a port which exports both oil and nuts. The river port of Kaolack also serves an important groundnut area on either side of the River Salum. The chief growing areas in Senegal are connected by road or rail with the ports.

Millet and maize as well as groundnuts are grown throughout the savanna lands and many cattle are reared.

*Dakar* (385,000) is the capital and chief port of Senegal. Its excellent harbour is used by ships en route to South America from France and also by naval vessels. Railways connect Dakar with St Louis and with the head of navigation of the Middle Niger at Koulikoro. Its chief export is groundnuts.

## MAURITANIA

Mauritania is mainly arid, stony desert on the western fringe of the Sahara, though there is some savanna country in the south where Africans rear cattle, sheep, and goats. It is a poor country and despite the fact that Mauritania is now independent, it must depend on friendship and help from France for many years to come. Products are few. There are oases in the desert to the north where some half-million Arabs and Berbers, mainly nomads, rear camels and cultivate dates.

Gum arabic is collected from acacias in the scrub-lands, salt is dug from shallow pans and sent by camel train to Timbuktu, and copper is worked at Akjoujt.

In the north-west of Mauritania, in the hills around the oasis of Fort Gouraud, high grade iron ore is mined at Zouerate. A 400-mile single track desert railway links the Fort Gouraud area with a new harbour at Cansado near Port Etienne where freighters can take on board 3,000 tons of ore an hour. Port Etienne is a small fishing port where Breton fishermen collect fine lobsters.

The capital of Mauritania is *Nouakchott*, a newly-built town on the caravan route which leads south to Senegal.

## MALI

Mali, formerly French Sudan, consists of the middle basin of the River Niger which flows through savanna country. In the north Mali extends into the Sahara Desert. The population is about 4½ million. The chief products are similar to those of Senegal, with groundnuts as the most important crop. These are collected at Bamako on the Niger and are sent by rail to Dakar for export.

Below Bamako, the Niger splits into smaller streams and the whole area is flooded in summer. In order to control the floods, and to provide water for irrigation, a large dam and power station has been constructed at Sansanding. Cotton, sugar, and rice are grown. Cattle form the chief export.

*Bamako* (120,000) the capital of Mali, is situated at the point where navigation of the Niger ends.

*Timbuktu*, an old town close to the Niger where savanna gives way to desert scrub, was formerly an important market town and centre for Saharan trade, but now the caravan routes are less used it has become less important. On the other hand, *Gao*, some 250 miles lower down the Niger, is increasing in importance. It has an airport and is on a trans-Saharan motor route. Road building is important in Mali. Good lorry routes for exports are being constructed to the ports of Conakry (Guinea) and Abidjan (Ivory Coast).

## NIGER, UPPER VOLTA. IVORY COAST, DAHOMEY, AND TOGO

These countries are less developed than Senegal and Mali. Most of the Niger Republic is a vast expanse of desert rising to well over 3,000 ft. Only in the south where there is savanna can crops be grown—mainly millet and groundnuts. Many cattle are reared. It is here that most of the 2½ million people live. *Niamey*, the capital, has an important airport. *Zinder* lies on a trans-Saharan motor route from Algeria.

Upper Volta, which has a population of nearly 5 million, lies in the savanna belt and cattle are reared on the pastures. Its capital, *Ouagadougou*, is linked by rail with the Ivory Coast port of Abidjan.

The Ivory Coast, Dahomey, and Togo lie mainly in the forest belt. Coffee and cocoa are the chief cash crops of the Ivory Coast which is the chief producer of coffee in Africa, and coffee represents 40 per cent. of the exports. *Abidjan* (190,000), the capital, has a factory for making "instant" coffee. Manganese, gold, and diamonds are being produced in increasing quantities. The links between the Ivory Coast and France are still strong.

Dahomey specialises in palm oil which is exported from *Cotonou*.

Togo exports phosphates from Lomé, the capital, which serves as a port for a large hinterland.

## GUINEA

Guinea has a population of 2¾ million. Coffee—the chief cash crop—comes from the highlands, oil palms, bananas, and rice are grown on the lowlands, and the coastal forests yield mahogany and other hardwoods. There are very rich coastal deposits of iron ore, some of which is exported to Britain, and bauxite forms the basis of an aluminium industry run with American money. Diamonds are also important.

*Conakry* (120,000), the capital and chief port, is linked with the interior by motor roads and a railway.

## LIBERIA

Liberia has been an independent negro republic since 1847. After the abolition of slavery, a society was formed in the

United States with the object of finding an African home for negroes who wished to return to the land of their fathers.

By 1822, land in West Africa had been purchased from the native Africans and many repatriated negroes had settled there. It was named Liberia and at first was a colony of the U.S.A., but in 1847 it became independent.

The population of about 2½ million consists of the Liberians—as the descendants of the freed slaves call themselves—and also of many native African negroes, most of whom live under tribal conditions and practise primitive agriculture. The Liberians form the upper classes and tend to regard the native Africans as inferiors, but there is some inter-marriage and a few native Africans hold Government posts.

Much of the country consists of tropical forests which contain palm oil trees and wild rubber trees. Native food crops include millet, cassava, and rice, but Liberia is not self-supporting in foodstuffs. Large rubber plantations have been established on land leased by the Liberian Government to the Firestone Tyre Company of the U.S.A. A German firm grows bananas. Plantation rubber and iron ore, of which Liberia has large reserves, are the chief exports. Diamonds—including smuggled gems from Sierra Leone—are also exported.

*Monrovia*, named after the United States' president—President Monroe, is the centre of Government and the only port. Ocean-going ships cannot enter the harbour but have to discharge passengers and cargo into small boats off shore. Liberia has few roads. A railway links Monrovia with the iron mines about 50 miles to the north.

## PORTUGUESE GUINEA

This is mainly a forest area with little development except along the coast. The chief export is palm kernels.

## ISLANDS IN THE GULF OF GUINEA

There are several volcanic islands in the Gulf of Guinea. Fernando Po (Spanish) is little developed; it exports timber, cocoa, and coffee to Spain.

The Portuguese island of Sao Thomé produces cocoa, coffee, copra, palm oil, and cinchona. It is served by a small railway bringing the products to the port of Sao Thomé.

## FRANCE AND EQUATORIAL AFRICA

Equatorial Africa stretches from latitude 5° S. to a little north of latitude 20° N., a distance of over 2,000 miles. France first became interested in this part of Africa when, in 1839, Libreville was built on the Gabon coast as a home for freed slaves. Gradually, French explorers penetrated the interior, reaching as far north as Lake Chad and the Tibesti Mountains. In 1910, the boundaries were fixed and French Equatorial Africa came into being. The greater part of the former German colony of Cameroon was added as mandated territory at the end of the 1914-18 war.

When in 1958 France gave her colonies the choice of complete independence or independence within the French Community, four countries of Equatorial Africa—the Central African Republic, and the republics of the Congo, Gabon, and Chad chose to become member states of the French Community. The whole area is sparsely populated with about 5 million Africans and a few thousand Europeans.

Cameroon, formerly a trusteeship territory under France, became an independent republic retaining close links with France. It has a population of about 5 million. In 1961 the Southern Cameroons, west of Duala, formerly a British trusteeship territory, federated with the republic.

### Surface Features, Climate, and Vegetation

Equatorial Africa may be divided broadly into three natural regions:—

(i) The hot, wet lowlands of Gabon; Cameroon; and Congo. These are covered with equatorial forest and much of the coast is fringed with sand-bars and mangrove swamps.

(ii) The higher country forming the watershed between the Congo and Chad drainage basins. This comprises much of the Ubangi-Shari Territory where rain falls mainly in summer and the dry season lengthens northwards.. The vegetation is savanna.

(iii) The Chad inland drainage basin where rainfall is low and thorn scrub with poor pasture gives place to desert in the extreme north.

## Economic Development

The resources of Equatorial Africa are, as yet, poorly developed. The chief products of the forest zone are palm oil, coconuts, timber, and rubber. Wild products are as yet more important than those grown on plantations. Cameroon is the best developed part of the forest belt and timber is one of the more important exports. There are plantations of palm oil trees, cocoa, and bananas, and a good system of roads links the interior with the coast. There is a railway from the port of Douala to the capital—Yaundé.

The savanna area offers a better climate for settlement and is the most densely peopled part of the country. Most of the people are African farmers but there are also a few Europeans. Cotton is the chief cash crop. Millet, maize, and groundnuts are grown for food and many native cattle are reared. This region suffers from inaccessibility. A good road links Douala with Fort Lamy but much of the traffic is by river or indifferent tracks.

In Chad. the scrub and poor grassland support many cattle, sheep, donkeys, camels, and ostriches, but lack of good transport and distance from the sea have hindered commercial development of this pastoral industry.

Manganese deposits are being developed. Oilfields are developing near Port Gentil where a refinery is being built. Other minerals such as copper, zinc, gold, lead, and diamonds are known to exist but are not yet worked.

*Pointe Noire* (57,000), the chief port of the autonomous Congo Republic, is linked by rail to *Brazzaville* (136,000), the capital, which is situated on Stanley Pool, on the Congo River, opposite to Leopoldville. It is a river terminus for navigation down the Congo and Ubangi. *Libreville* (31,000) the capital and Port Gentil are the chief seaports of Gabon.

*Douala* (120,000) is the chief port of Cameroon. It is a modern town and its airport lies on the route from Europe to Cape Town. The capital is *Yaundé*.

*Fort Lamy* (46,000) is the capital of Chad. Not only is it linked by road with Douala, but it is situated on an

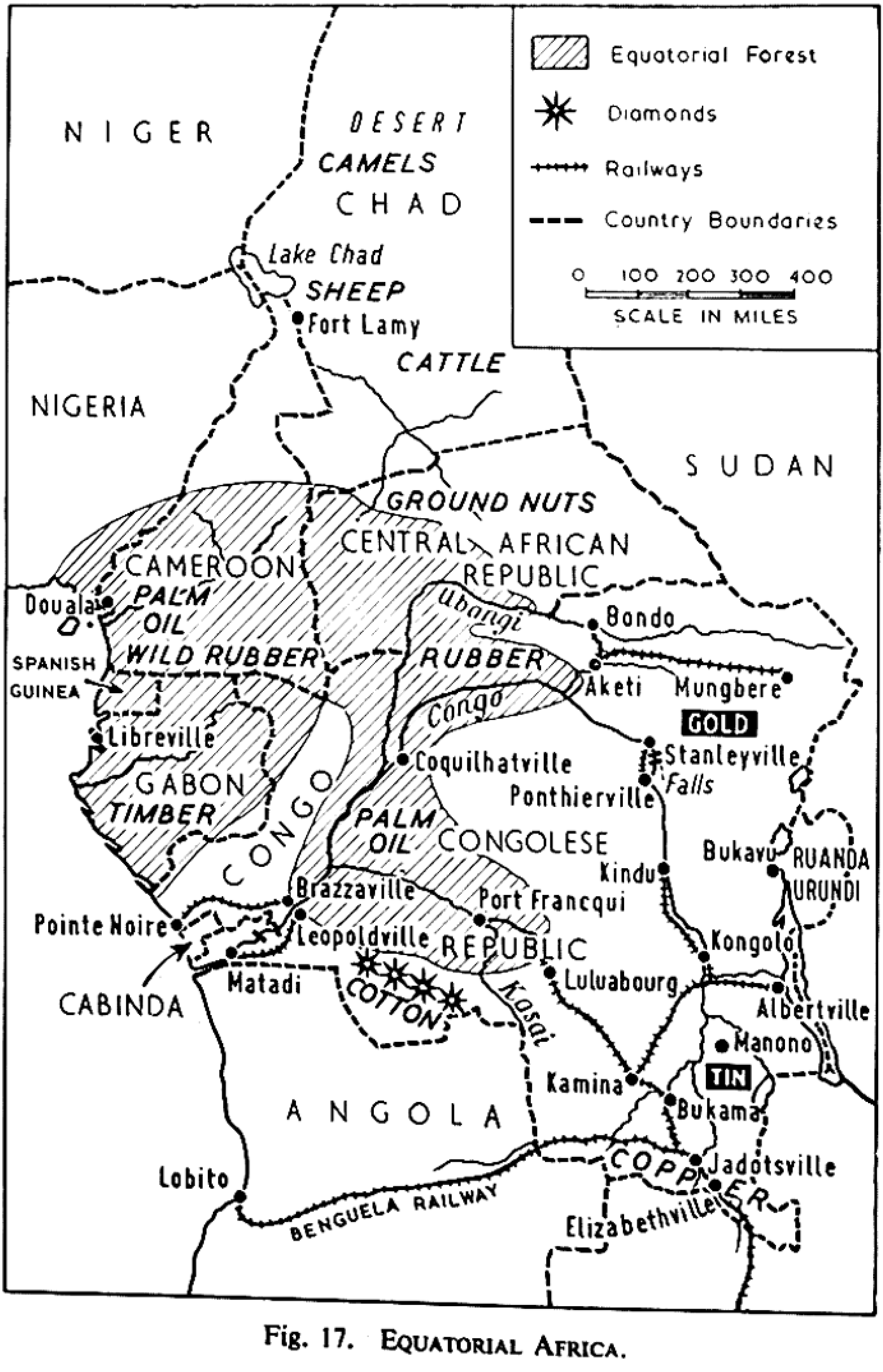


Fig. 17. Equatorial Africa.

important trans-Saharan route from Algiers to West Africa, both by air and road. Much of the desert road is, however, a difficult one.

### Trade

Exports of Equatorial Africa include timber, palm oil, cotton, and ivory. Imports are chiefly manufactured goods. The foreign trade is small; France takes most of the exports and provides most of the imports.

## THE CONGOLESE REPUBLIC

The Congolese Republic lies astride the Equator. It covers a million square miles—nearly twice the area of the Republic of South Africa, and half the area of Europe. There are only 100,000 Europeans in the whole country compared with 14½ million Africans which include tribes covering a wide range of culture. The most primitive people are the pigmies who inhabit the Ituri forests north-east of Stanleyville. These people are practically untouched by European civilisation. They live by hunting and collecting wild fruits, and they have no permanent homes. Although sturdily built, pigmies only average about four feet in height. But most Africans in the Congo Basin live by agriculture or by working in plantations or mines. There are many tribal groups and many dialects are spoken.

For more than fifty years the Congo was ruled by Belgium under a system of indirect rule. Everything was done under strict white supervision. Workers were well housed, schools and hospitals were provided, but the Belgian Government frowned on any move by Africans to take part in politics. Then, quite suddenly, Belgium granted independence to the Congo—a country where the native Africans were quite inexperienced in political methods. The result was chaos. There was a struggle for power among African leaders, a breakdown in public services, and a decline in every kind of production. The country is still disorganised and will take many years to recover.

### Surface Features

The Congo is essentially the basin of the River Congo and its tributaries. It consists of an extensive low-lying central area surrounded by higher land which is breached only where the Congo escapes to the sea. Volcanic mountains which flank the Western Rift Valley form the highest part of the country. The highest mountain is Ruwenzori—16,795 ft. Although near the Equator it carries glaciers on its upper slopes.

The River Congo is never short of water since it lies in a region of fairly heavy rainfall and has numerous tributaries. Those which rise north of the Equator bring down most water in the northern summer, while the southern tributaries are fullest in the southern summer. The Ubangi is the largest right-bank tributary. Of the numerous left-bank tributaries, perhaps the Kasai is the most important.

The Congo and its tributaries provide thousands of miles of navigable waterways, but they are frequently interrupted by rapids and waterfalls. Unlike the River Amazon, Congo waterways are not open to the sea. The Livingstone Falls, which involve a drop of over 800 ft between Leopoldville and Matadi, prevent access from river to ocean. They are by-passed by a railway. Above Leopoldville, the Congo is navigable as far as Stanleyville, a distance of 1,068 miles. Regular steamer services ply between these two towns, the journey upstream taking eleven days. In this part of its course, the Congo resembles a vast lake studded with islands. In some parts the river is more than ten miles wide. Above Stanleyville, only short stretches of the Congo are navigable because rapids obstruct the course of the river. A short railway which links Stanleyville with Ponthierville provides a portage round the Stanley Falls. Rapids between Kindu and Kongola are also by-passed by railway.

Another important river route is that from Leopoldville, down the Kasai River to Port Francqui, whence a railway runs to Elisabethville and Zambia.

### Climate and Vegetation

As the Equator nearly bisects the Congolese Republic, climate and vegetation belts are repeated on either side of it. In general, the country may be divided into two main natural regions:—

(i) Low-lying areas in the centre of the basin.
(ii) Highland plateaux which form the rim of the basin.

THE LOW-LYING AREAS have a hot, wet equatorial climate with thunderstorm rain. Since the basin is, to some extent, cut off from the rain-bearing winds by the highlands which surround it, the average annual rainfall of just over 60 in. is less than that experienced in the Amazon Basin (over 80 in.).

Natural vegetation consists of dense equatorial forest. The collecting of wild rubber was once the most important occupation but today the forests yield little of economic importance. Although there are valuable trees they are only exploited to any extent in the country lying on the north side of the Congo estuary. Here there is easy access to the sea through the port of Boma. Although much of the cut timber is used locally, several types of hardwood are exported.

THE PLATEAUX which form the rim of the basin have most rain when the sun is overhead. The dry season increases in length with distance from the Equator. The area most suitable for European settlement is in the Katanga province where the plateau averages 5,000 ft in height. This is also the part of the country which is furthest from the Equator. Here the combined effect of altitude and latitude reduces the average monthly temperatures which range from 24° C. (*75° F.*) to 16° C. (*60° F.*). There is also some white settlement in the Eastern Highlands. Savanna clothes the plateau to about 6,000 ft. Where mountains rise above this height, as in the east of the country, slopes above 9,000 ft are usually covered by dense forest and bamboo thickets which merge upwards into mountain grassland.

## Chief Products

Palm oil and palm kernels together are the chief agricultural export of the Congolese Republic. The industry is largely in the hands of European companies; the most important concern is controlled by Lever Brothers—the British soap manufacturers. The quality of the oil is good since much of it is pressed by modern factory equipment. Large quantities are exported though, as in Nigeria, a good deal is also consumed locally.

Rubber plantations started during the 1939-45 war have developed rapidly and rubber is now second only to palm oil as an agricultural export.

Cotton is widely grown as a cash crop by Africans living in the savanna regions. The chief producing areas lie along the northern frontier near the Uele River, and in the Kasai province.

Coffee is grown as a plantation crop on European-owned estates, and is also an important cash crop grown by the Africans. The eastern highlands are the most important producing area. Much of the crop is consumed locally but a surplus is sent overseas.

Sugar-cane is grown chiefly in the western part of the country. A refinery at Leopoldville produces refined sugar for local consumption.

Quinine production increased as a result of the war when supplies from South-East Asia—the chief source of quinine—were not available. It is grown in several places in the eastern highlands. The bark is treated at a factory in Costermansville which now turns out enough quinine for local needs.

Tobacco of a rather inferior quality is grown by the Africans for their own use. Several plantations in the eastern highlands and in Katanga supply the needs of the white population.

Maize is the only cereal grown in the Congolese Republic in large enough quantities to be exported. Its cultivation is rapidly spreading in some savanna areas, where it is also an important local foodstuff. Other native foods are manioc, upland rice, and bananas.

Tea cultivation by Europeans is becoming increasingly important in the Kivu highlands.

Copal, a form of gum obtained from plants which grow in swampy areas is collected for export and for use in the paint and varnish factory at Leopoldville.

Cattle are reared by the Africans of the savanna lands and herds have been improved by imported stock in Katanga and the eastern highlands. Disease is still a serious drawback.

### Minerals

The Congolese Republic possesses a great variety of minerals, and provides one of the most important sources of copper in the world. Copper is the most valuable item of export and the Congolese Republic is also by far the world's largest producer of commercial diamonds and cobalt. Minerals have been responsible, more than anything else, for the economic development of the country. Not only are they of great value in themselves but, in order to export them, it has been necessary to build roads, railways, and smelting plants. Agriculture has been encouraged in order to provide food for the workers, and the Africans have benefited by the schools and hospitals which the mining companies have provided.

The principal mineral area is centred on *Elisabethville* (200,000) in Katanga province, near the border of Zambia. Its chief disadvantage is the remoteness from seaports. Although coal is mined near Bukama, it is not of good quality. Much of the coal used comes from Rhodesia and South Africa, both connected by rail with the Katanga area. There is also abundant water-power; important hydro-electric plants about 200 miles north-west of Elisabethville supply power and light for the mining areas.

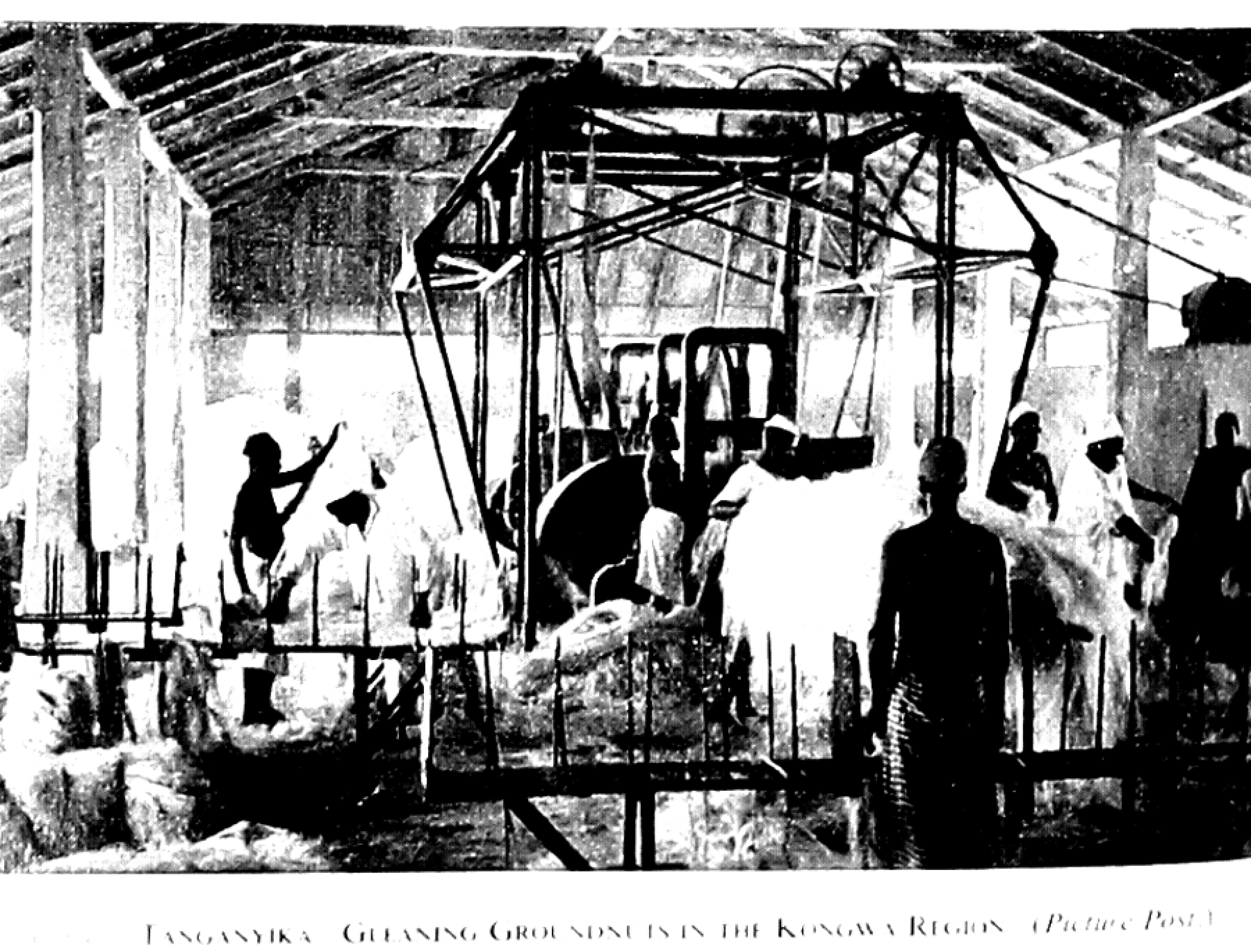
The rich copper deposits of Katanga lie in the extreme south-east of the province. They are a continuation of the copper-mining district of Zambia (p. 109). Copper accounts for 30 per cent. of the total value of exports from the Congo. The ore is smelted near the mines and also at *Elisabethville* and *Jadotville* (75,000). Almost all the copper exports consist of concentrates.

Cobalt is associated with copper and is extracted at many of the mines. One of the most important radium-uranium deposits in the world is also associated with Katanga copper.

The ores come mainly from open-cast workings which are mainly in the hands of Belgian companies and it is fortunate that Katanga is suitable for white settlement. Africans supply the manual labour, but there is difficulty in securing enough workers since the population is so thinly spread. Labour has therefore to be brought in from more distant

*Above* Nigeria: Plywood Mill at Sapele. (*United Africa Co.*)

*Below* An African Village in the Congolese Republic. (*Belgian State Railways.*)



Tanganyika: Gleaning Groundnuts in the Kongwa Region *(Picture Post)*

*Below*: Tanganyika: Cleaning Dried Sisal Fibre *(East African Office)* areas. Steps are being taken to promote African personnel to more responsible positions in the mining companies.

Manganese, zinc, iron, tin, tungsten, wolfram, platinum, silver, and bismuth, are also obtained from the Katanga area. Tin is important and is also mined in other localities. Some of the ore is smelted locally.

Diamonds are obtained from the alluvial deposits in the basin of the Kasai River, and they are also found in the north-east. The Congolese Republic supplies large quantities of industrial diamonds. Most of them go to the United States and Russia.

Gold is obtained, mainly from alluvial deposits, in the north-east of the country, especially in an area west of Lake Albert.

The great distance of the mining areas from the coast is a major problem in exporting the mineral ores. The chief ports which serve the Katanga region are Matadi on the Congo estuary, Lobito in Portuguese Angola, Beira in Mozambique and Dar-es-Salaam in Tanganyika. Most copper and mineral exports go by the "national" route to Matadi which involves three stages:—

(*a*) From Elisabethville by rail to Port Francqui.
(*b*) From Port Francqui by river steamer down the Kasai and the Congo to Leopoldville.
(*c*) From Leopoldville by rail to Matadi.

There is direct rail communication between Elisabethville and Lobito and this is the shortest route to the sea. The rail route to Beira is longer since it goes via Bulawayo in Rhodesia. The journey to Dar-es-Salaam involves five stages.

(*a*) From Elisabethville by rail to Bukama.
(*b*) From Bukama by river steamer down the Upper Congo (here called the Lualaba River) to Kabalo.
(*c*) From Kabalo by rail to Albertville on Lake Tanganyika.
(*d*) From Albertville by lake steamer to Kigoma.
(*e*) From Kigoma by rail to Dar-es-Salaam.

## Chief Towns

The chief towns of the Congolese Republic are sea, river, or lake ports, and mining centres. Some have already been mentioned.

*Leopoldville* (1,000,000) is the administrative centre. Its position at the western terminus of navigation on the Middle Congo, where river transport gives place to rail, has helped to make the town a trade centre. It also commands routes up the Kasai River (Fig. 17) and up the Ubangi River to the north-eastern highlands. It is a modern town and has many industries run by hydro-electric power produced locally. It has an important airport.

*Matadi* (60,000) is the chief port.

### Trade

The chief exports of the Congolese Republic are copper, cobalt, palm oil, timber, cotton, tin, diamonds, coffee, rubber, and gold.

Imports are chiefly machinery, metal goods, textiles, and vehicles. Belgium supplies most of these; the rest come mainly from the U.S.A., Western Germany, and Britain.

## RWANDA AND BURUNDI

Rwanda and Burundi (Fig. 17*a*) are small countries to the east of the Congolese Republic, with Uganda to the north and Tanzania to the east. They are the most densely peopled countries in Africa with nearly 6 million people, depending largely on coffee. Quinine is also grown.

In both countries farming is concentrated mainly on producing subsistence crops of beans, cassava, maize, sweet potatoes, groundnuts, and bananas.

The capital of Rwanda is centrally situated at *Kigali* (7,000).

The capital of Burundi is *Usumbura* (70,000) which lies at the northern end of Lake Tanganyika. A main road from Uganda to the Congolese Republic passes through both capitals (Fig. 17A).

## ANGOLA

Angola is the largest overseas territory of Portugal—nearly fourteen times as large as Portugal itself. It is not a colony in the ordinary sense but a province of Portugal, ruled from Lisbon through a Governor General. The population of 5 million chiefly consists of Africans but there are also about

173,000 Europeans who live mainly in the ports and on plantations, and some 53,000 mulattoes. There is much unrest in the country, largely due to Portugal's policy of developing the country primarily in the interest of the Europeans. Portuguese peasants, artisans, and skilled labourers have been encouraged to settle in Angola, so limiting the opportunities for African advancement. In 1961, the Africans, seeking self-government, staged a revolt which the Portuguese quelled with loss of life on both sides.

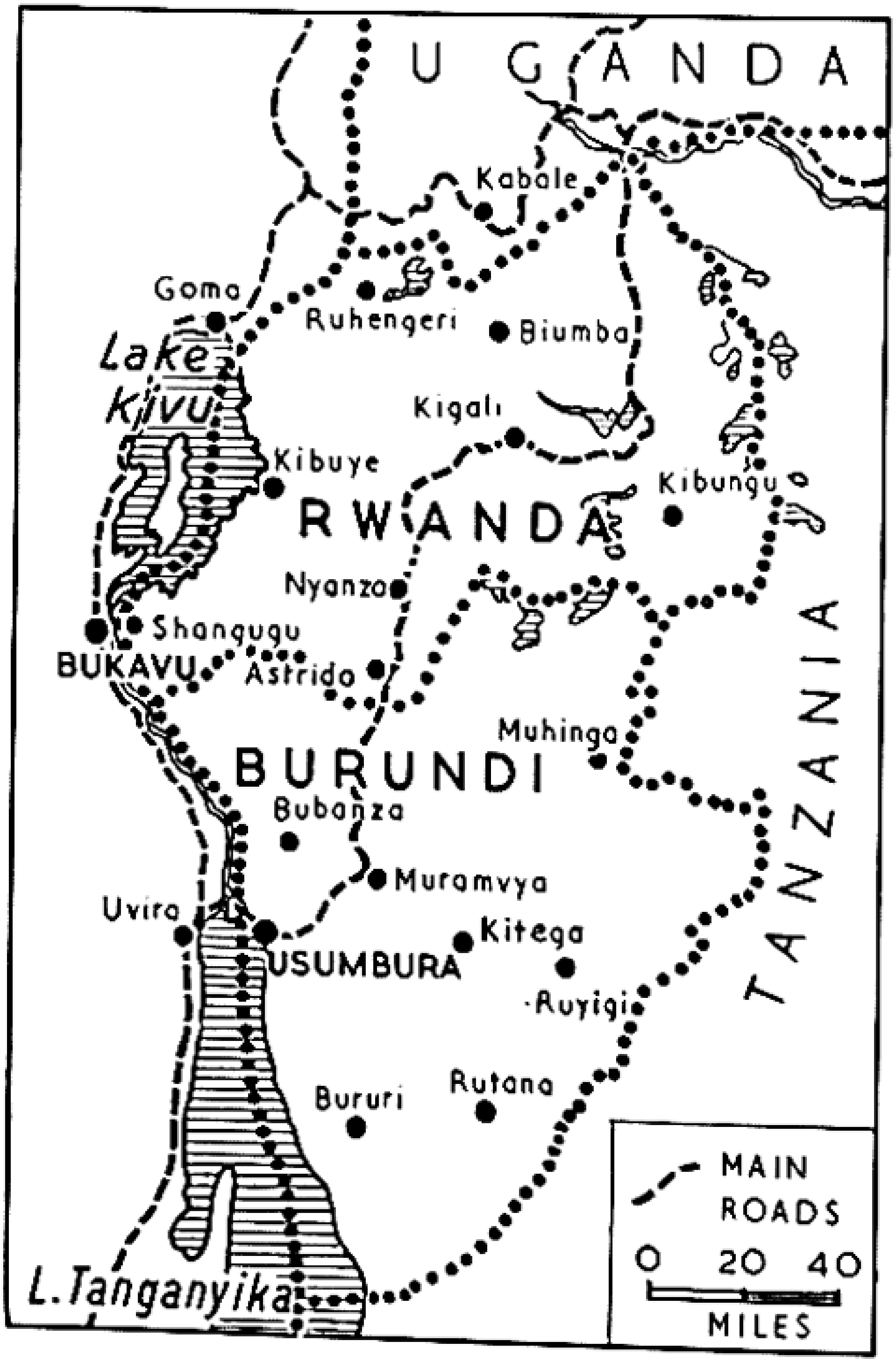


Fig. 17*a*.

## Surface Features, Climate, and Vegetation

Much of Angola is plateau with an average elevation of 3,000 ft. The Bihé plateau which rises in places well over

5,000 ft is the highest part of the country. It forms part of the watershed between the Congo and the Zambezi. The lowland areas are found in a narrow belt along the coast and in the valleys of the many streams which dissect the plateau. The coastal area is cooler than similar latitudes on

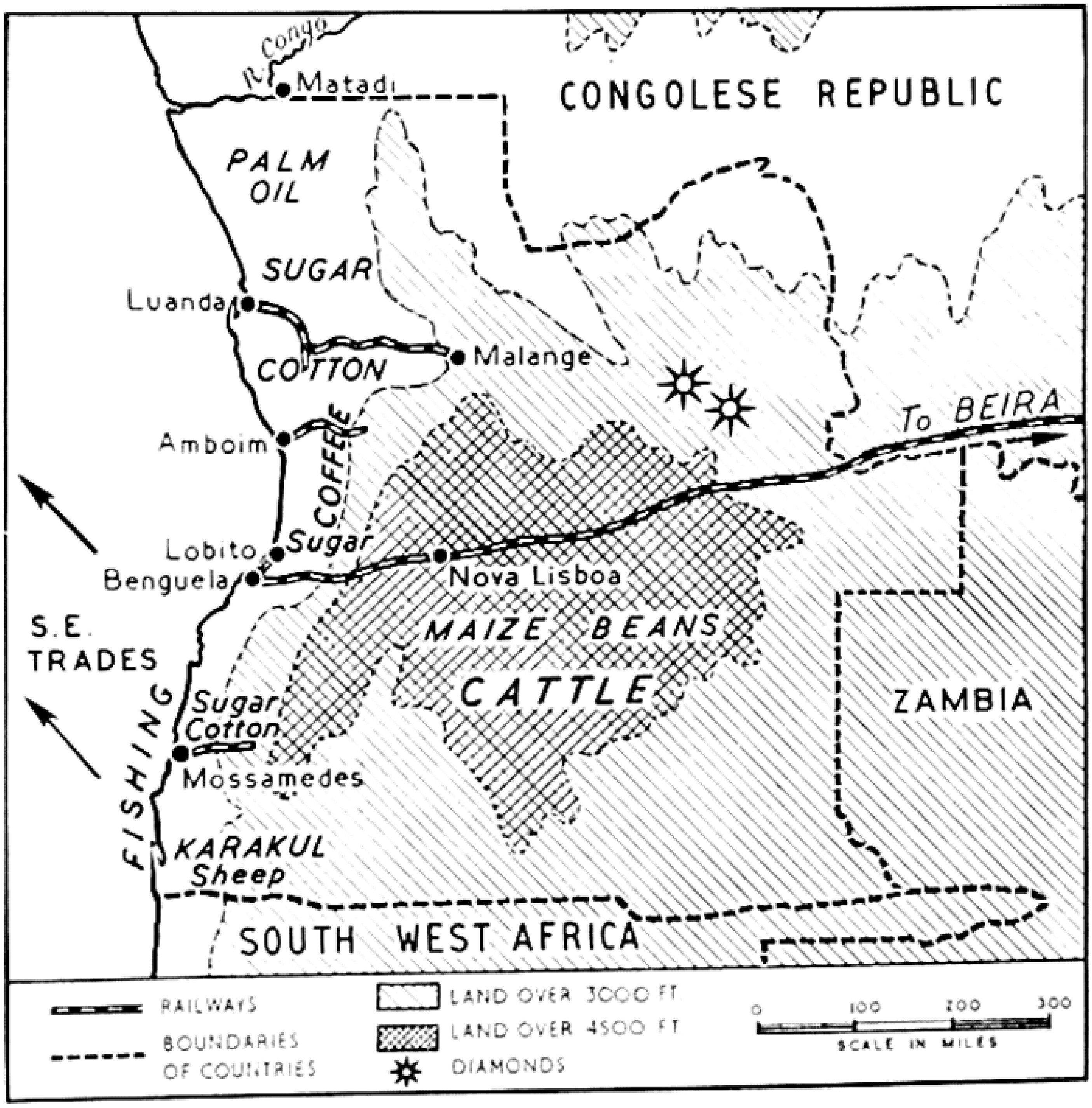


Fig. 18. Portuguese West Africa (Angola).

the east coast of Africa and also has a low rainfall. This is largely due to the presence of off-shore south-east trade winds and to the cool Benguela Current. Except near the Congo estuary, the natural vegetation of the coastal region is scrub. The river valleys, however, have more rain and it is here that rain forests are found—particularly in the north of the country. The rainfall of the plateau, on an average 40 to 60 in. a year, comes mainly in summer but is adequate for agriculture.

Here the vegetation is savanna. The Bihé plateau is the most suitable part of the plateau for African and white settlement.

### Economic Development

The wealth of Angola is based on agriculture, fisheries, and industrial diamonds. It is in the hands of a small minority, many of whom live in Portugal. Remarkably little money is spent on education and social services for the African.

Coffee is the most valuable crop and almost the whole output is exported. It is grown on the hill slopes of the coastal region, especially near Port Amboim. There are many European plantations but about one-fifth of the crop is grown by Africans.

Maize is normally the next most valuable crop, about half of which is exported. It is grown almost entirely by Africans.

Palm oil is produced almost entirely by European planters, and the output has greatly increased. Palm kernels are also exported, about half of them collected by Africans from wild trees.

Cotton is produced by Africans in the coastal area and sent to the textile mills of Oporto in Portugal.

Sisal is grown on plantations owned by Europeans, usually at altitudes of between 2,000 and 4,000 ft, and sugar is produced in irrigated plantations on the coastal plain.

Wild forest products include timber and waxes. One of the chief foods is manioc, but there is a surplus for export, most of which goes to France.

Since the tsetse fly is prevalent in the northern half of the country, cattle rearing is mainly carried on in the south where it is a native industry. Hides are produced for export.

FISHERIES. The sea off the southern coast of Angola is rich in fish, and a fishing industry is centred on Mossamedes, where there are canning factories. Dried fish is an important native food and there is an export, especially to the Congolese Republic, though the industry has recently declined in importance. Tinned fish are exported to Portugal.

MINERALS. Diamonds obtained from the extreme north-east of Angola form the second most valuable export after coffee. The area is connected by roads both with the Benguela railway and also with the Luanda railway at Malange.

The production of iron ore and manganese is increasing and oil is produced near Luanda. There is a local refinery but crude oil is exported and refined in Lisbon.

INDUSTRY. There is a textile mill at Luanda, and there are factories elsewhere making ploughs and hoes for native agriculture, cement, soap, paper pulp and cellulose, and food products. Power is supplied from the hydro-electric station at Cambambe.

## Chief Towns

*Luanda* (40,000) is the present capital of Angola, though *Nova Lisboa*, a town on the Benguela railway, situated on the plateau, has been chosen as the future capital. Luanda is an important port connected by rail with Malange, a commercial centre on the plateau. It has a jute factory, cement works, and food processing plants, and an airport used by the airline from Lisbon to Lourenço Marques, and for services within the country. Around the city are slum townships in which the poorer Africans and some whites live.

*Lobito*, the chief port of Angola, has a good modern harbour and is the western terminus of the trans-continental railway to Beira. It is an important outlet for the exports of Angola and also for the minerals of Katanga (pp. 76-7).

Other ports have poor facilities for ocean-going vessels, but there are plans for making *Mossamedes* into a modern port.

## Trade

Portugal is by far the most important market for Angola exports, of which she takes about a quarter. By her purchase of diamonds, Great Britain ranks as the second buyer. Other markets for exports are the U.S.A. (coffee and sisal), Belgium, the Netherlands, and Germany. The chief exports are coffee (about half the total), diamonds, sisal, maize, sugar, cotton, and groundnuts.

The most important import is cotton textiles; others include coal, machinery, petroleum, and wheat flour.

# CHAPTER V

## THE EASTERN HORN OF AFRICA

### ETHIOPIA

The Ancient Empire of Ethiopia consists essentially of a high plateau, much of it over 6,000 ft, cut into two blocks by the Great African Rift Valley, which is studded with lakes. In the larger block, north of the rift valley, a deep depression is occupied by Lake Tana which overflows to become the source of the Blue Nile. The Sobat and Atbara rivers also rise in the Northern Ethiopian Highlands. All these rivers flow swiftly in deep gorges; they are not only useless for transport but their deep-cut valleys hinder cross-country journeys.

Ethiopia has a high rainfall. In spring and summer, as the land over the Sahara Desert and Arabia becomes heated, a vast low-pressure area forms which draws the winds inwards from the sea—first from the south-east and later also from the south-west. They rise over the plateau giving heavy monsoon rain, especially to the southern slopes. The rainy periods succeed one another; first come the "Little Rains" from February to May, when there are heavy showers every day but also some bright, dry weather. Then follow the torrential "Big Rains" which bring work and movement almost to a standstill. Streams and rivers become swollen and overflow, level land becomes marshy, and the rich volcanic soil is turned into thick mud. At this season the roads—poor at the best of times—become impassable even for pack animals. The rainfall sequence is well illustrated by the average monthly figures for Addis Ababa:—

| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rainfall in inches. | 0·6 | 1·5 | 2·8 | 3·2 | 2·5 | 5·6 | 11·2 | 11·9 | 6·4 | 0·6 | 0·7 | 0·1 |

The "Big Rains" are of enormous importance to the Sudan and Egypt since the water drains into the Blue Nile and other rivers, and reaches the Nile charged with rich mud from the plateau soil. When it reaches Egypt the water is used for irrigation and the fresh soil keeps up fertility (see p. 39).

The 22 million people of Ethiopia belong mainly to the Hamitic race with thin noses, sharp eyes, and thin lips; some are Moslems, others—including the ruling class, the Amharas—profess a form of Christianity. The approaches to the plateau, and the lower slopes, are inhabited by warlike, nomadic people, but the population is mainly concentrated on the plateau between 6,000 ft and 8,000 ft above sea level, though much of the higher land is also well peopled. Few Ethiopians can read or write.

The plateau is covered partly with grass, partly by large areas of forest. In most places the soil is rich and grows good crops. Maize and millet predominate in the lower, hotter parts; wheat and barley grow well in the higher, cooler areas. On the grassland cattle, sheep, and goats are grazed, and hides and skins are an important export. In the west of Ethiopia coffee grows wild but it is also cultivated in the country around the town of Harar, just south of the only railway. Coffee is Ethiopia's chief export.

Throughout the plateau region the people live in villages of thatched huts, producing their own food which includes raw meat and large quantities of pepper. Transport is mainly by camel, mule, or donkey.

There are a few arterial roads such as the highway linking *Asmara* in Eritrea with the Red Sea port of Massawa. Air transport, however, has shown a vast expansion; an internal network links the capital with twenty-eight provincial cities and the airports at Addis Ababa and Asmara can accommodate jet aircraft.

*Addis Ababa* (450,000), the capital and seat of the Emperor, lies among eucalyptus-clad hills above the northern slopes of the rift valley, and is about the only city in the country where good roads, modern buildings, and electric light may be seen. It is approached either by rough, tortuous caravan routes, or by the single-line railway from Jibuti in French Somaliland (500 miles) which is the main outlet for export of coffee, skins, honey, oil seed, and grain. Addis Ababa is the headquarters for the organisation of African unity.

Eritrea, which lies between the Sudan and Ethiopia on the west, and the Red Sea on the east, was formerly an Italian colony. In 1952 the country was united with Ethiopia under a United Nations plan, whereby the Eritrean Government retained a large measure of domestic autonomy.

The country consists of a strip of lowland along the Red Sea coast backed in the north by a steep escarpment rising to 10,000 ft above the sea. Inland, slopes descend gradually to the plains of the Sudan. Further south towards French Somaliland, there is an isolated ridge separated from the northern escarpment by a depression which is below sea level and occupied by salt desert.

The coastal region has a low rainfall (Massawa's annual average is 7 in.), but over much of the country scrub vegetation provides grazing for sheep and goats. Most of the million people are nomadic herdsmen of the Semitic race—some Moslems, some professing Christianity.

Apart from hides and skins there are few products. A little cotton is grown in irrigated plantations near Massawa, the chief port, and further south salt is prepared for export.

*Asmara*, the capital of Eritrea, which is nearly 8,000 ft above sea level, has a population of 120,000. There are separate quarters for Moslems and Christians. A railway links Asmara with its port, *Massawa* (27,000), and also runs inland towards the Sudan frontier.

## FRENCH SOMALILAND

This French territory guards the Straits of Bab el Mandeb opposite Aden. It has few products but its chief town and port, *Jibuti* (42,000), is the terminus of a railway which runs nearly 500 miles inland to Addis Ababa in the Ethiopian Highlands. It provides the main outlet for the exports of Ethiopia—hides, cattle, and coffee.

## SOMALI REPUBLIC

The Somali Republic was born in 1960 by a union of the former British Somaliland Protectorate and the former United Nations Trust Territory of Somalia. It includes the whole coastal area of the eastern horn of Africa and extends up to 300 miles inland, the land rising towards the highlands of Ethiopia. Everywhere the rain is scanty (Berbera, on the Gulf of Aden, has an annual average of 2½ inches), but there is sufficient grass to provide grazing for sheep and goats, though cultivation is not possible without irrigation. Water from the Ethiopian rains (see p. 83) flows from the mountain slopes to the north in a number of rivers of which the Juba and Webbi Shebeli are the largest.

The Somali Republic has a population of 2½ million, mainly nomadic tribesmen who wander from place to place in search of pasture for their camels, sheep, and goats. The camels are used to carry mat huts used for shelter, and to provide fresh milk. The tribesmen often cross the national boundaries into the Haud district of Ethiopia and the Northern Frontier District of Kenya, two areas which the Somali Republic would like to include within its boundaries.

In parts where water is available for irrigation, especially in the valleys of the Juba and Webbi Shebeli, crops are grown. Fruit growing is important in the Juba valley—especially bananas, and some cotton, sugar-cane, maize, and rice are grown. Wheat and sorghum are produced to the west of Berbera near the Ethiopian border.

Exports include live sheep, hides and skins, and salt obtained by evaporating sea water in shallow depressions in the hot sun. The salt is sent mainly to India. Mineral wealth, which includes coal, has not yet been exploited.

*Mogadishu* (100,000), the capital and chief port, is linked by road and by a short railway with its immediate hinterland.

*Berbera* lies on the Gulf of Aden near the entrance to the Red Sea. In the cool season it has a population of 30,000 but in the hot summer half of the people go to the hills to avoid the excessive heat.

*Kismayu* is the port for the produce of the Juba Valley, exporting bananas to Italy.

# CHAPTER VI

## EAST AFRICA

Three countries and two islands may be grouped loosely under the heading "East Africa". These include Kenya, Uganda, and Tanzania (the former country of Tanganyika with the islands of Zanzibar and Pemba). They are all independent states within the British Commonwealth.

The region divides physically into two main parts:—

(i) The Coastal Plain between the Indian Ocean and the African plateau, with the islands of Zanzibar and Pemba, where the climate is hot and wet.

(ii) The Plateau which rises to an average height of about 4,000 ft, where the climate is cooler and drier.

### Historical

Arab traders had used settlements along the coast of East Africa long before Vasco da Gama landed at Malindi in 1498, and they continued to maintain a firm control until Portuguese traders established settlements in the eighteenth century. Later, Arab influence increased again and in the early nineteenth century was dominant. The Arabs seldom penetrated far inland to the territory inhabited by African tribes except to collect ivory or to round up negroes to sell as slaves. Between 1857 and 1863 three famous explorers, Burton, Speke, and Grant, found Lake Tanganyika and discovered the sources of the Nile.

In 1886, after much haggling, Britain and Germany agreed on spheres of influence extending as far inland as Lake Victoria but leaving a coastal strip ten miles wide to the Sultan of Zanzibar. This strip was later granted to Britain and Germany. The British East Africa Company then began to open up the interior of Kenya and the country of Uganda, while the Germans were developing the country to the south—Tanganyika. A little later Zanzibar, Pemba, and Uganda were all declared British protectorates. Uganda, however, proved to be so difficult of access that it was decided to build a railway from Mombasa to Kisumu on Lake Victoria, across the mountains and lion-infested savannas. This line was completed, with the help of labour from India, in 1901.

## KENYA

### Physical Features and Climate

The northern parts of Kenya are very dry and support only a very sparse population; they are of little economic importance. Most of the people live in the southern parts, either on the coast or on the high plateau.

The coastal lowlands are hot throughout the year, and in the south there is a rainfall of between 40 and 50 in. per annum with a maximum in April and May when the south-east winds blow from the Indian Ocean. The climate is not so oppressive, however, as in the coastal lowlands of West Africa. The figures for the port of Mombasa are fairly typical.

| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Temp. in ° C. | 27 | 27 | 28 | 27 | 26 | 25 | 24 | 24 | 25 | 26 | 26 | 26 |
| Temp. in ° *F.* | *80* | *80* | *82* | *81* | *78* | *77* | *75* | *76* | *77* | *78* | *79* | *79* |
| Rainfall in inches. | 1 | 1 | 2 | 8 | 14 | 4 | 4 | 2 | 2 | 3 | 5 | 2 |

Between the coastal lowlands and the high tableland of the interior rise low hills which have a much lower annual rainfall, seldom more than about 20 in. The Kenya Highlands and the high plateau above about 5,000 ft (see Fig. 20), have one of the best climates in Africa—cool and invigorating. Mount Kenya rises to 17,040 ft. To the west of Mount Kenya and the chief city of Kenya—Nairobi, lies the Great African Rift Valley which extends from the Red Sea, through the mountains of Ethiopia, and across Kenya and Tanzania (see Fig. 19) to include Lake Malawi to the south. A western branch swings west and north from Lake Malawi to Lake Albert, taking in Lakes Tanganyika, Kivu, and Edward. The Rift Valley lakes are long, narrow, and deep; Lake Tanganyika, for example, is over 4,000 ft deep in places.

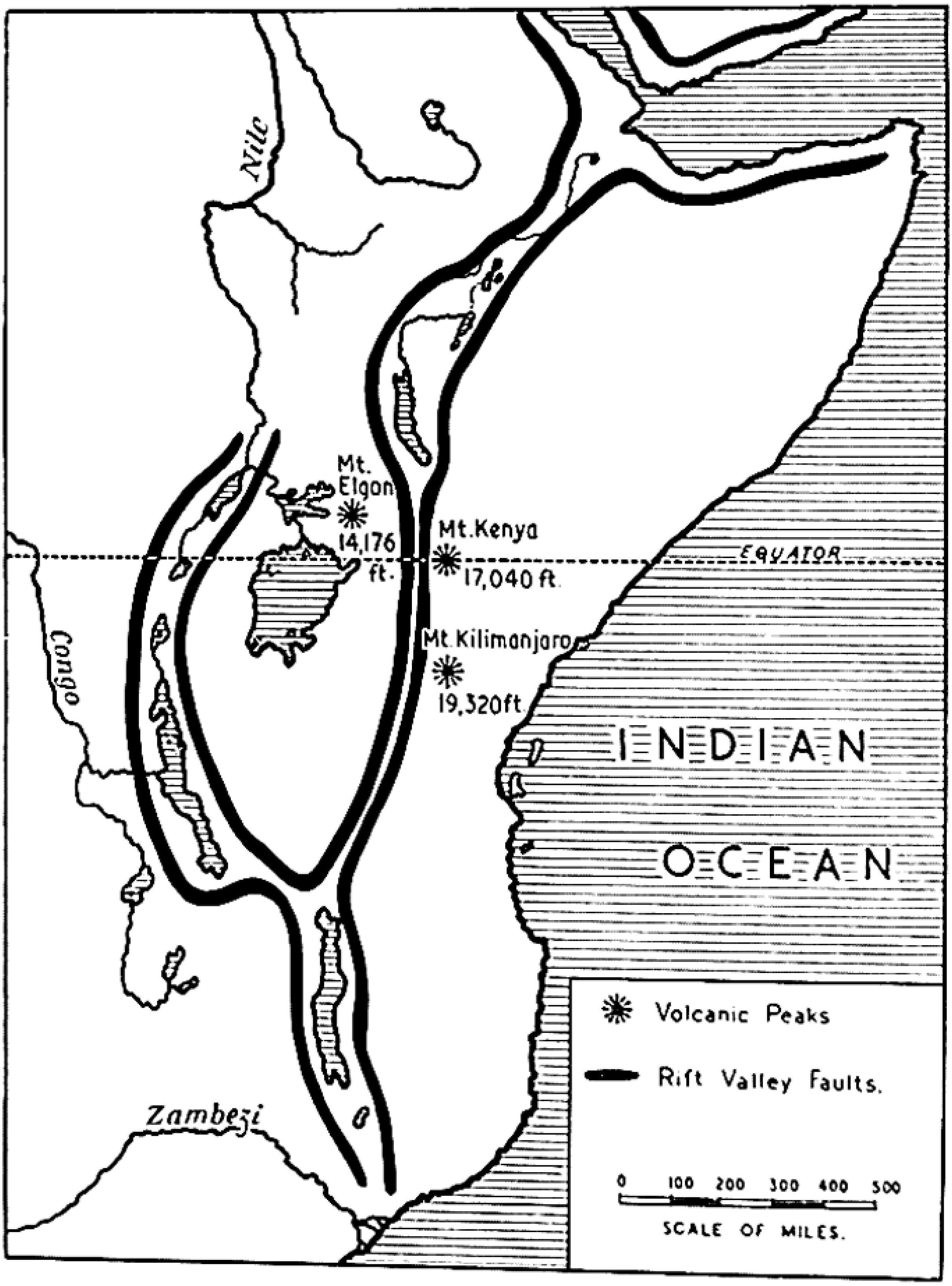


Fig. 19. The Rift Valley of East Africa.

Lake Victoria, on the other hand, which occupies a saucer-shaped depression between the two main branches of the Rift Valley, is relatively shallow.

The Kenya Highlands and the Rift Valley have mean annual temperatures similar to those of an English summer (see figures for Nairobi given in the table on p. 90). The rainfall of the plateau is about 40 in. a year, and rather heavier near Lake Victoria. It falls mainly between April and June (the "Long Rains"), and between October and December (the "Short Rains"), as will be seen from the following figures for Nairobi which has an altitude of 5,450 ft:—

| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Temp. in °C. | 18 | 18 | 18 | 18 | 17 | 17 | 15 | 15 | 17 | 18 | 18 | 17 |
| Temp. in °*F*. | *64* | *65* | *65* | *64* | *63* | *62* | *59* | *59* | *62* | *65* | *64* | *62* |
| Rainfall in inches. | 1·9 | 4·2 | 3·7 | 8·3 | 5·2 | 2·0 | 0·8 | 0·9 | 0·9 | 2·0 | 5·8 | 3·5 |

## The People of Kenya

The population of Kenya is 8,640,000, made up as follows:—

| | | | |
|---|---|---|---|
| Africans | 8,373,000 | Asians | 177,000 |
| Europeans | 56,000 | Arabs | 34,000 |

The Arabs are mainly concentrated in the coastal strip but more than half the Europeans and Indians live on the high plateau surrounding Nairobi. The Indians, many of them descendants of the workers who came in to build the railways, are mainly shopkeepers. The white population includes a small number of farmers who grow crops and keep cattle on the Kenya Highlands.

## Natural Regions of Kenya

There are five contrasting natural regions in Kenya—the Arid North, the Coastal Lowlands, the Slopes of the Plateau, the Kenya Highlands, and the Lake Victoria Uplands.

THE ARID NORTH comprises more than half of the whole country, and is practically without water; the few rivers that flow through the region to Lake Rudolf, or to the sea, rise and collect their water in the Kenya Highlands. It is known politically as the Northern Frontier District of Kenya. Some 200,000 Somali tribesmen herd cattle and camels on scanty pastures but the land is sparsely peopled. Mainly Moslems, they feel more affinity with the Somali Republic than with

Kenya. *Wajir* is a small town used as a watering place for livestock.

THE COASTAL LOWLANDS of Kenya which, as a region, extend about fifty miles north, and fifty miles south of Mombasa, and ten to fifteen miles inland, have an annual rainfall of over 40 in. The coast itself is fringed with mangrove swamps, and coconut palms which produce copra for export. Inland the native Africans grow maize, rice, and sugar-cane. Sisal, a plant with large sword-like leaves, is grown in plantations on some of the poorer soils. (See p. 99 for a fuller description of sisal cultivation.)

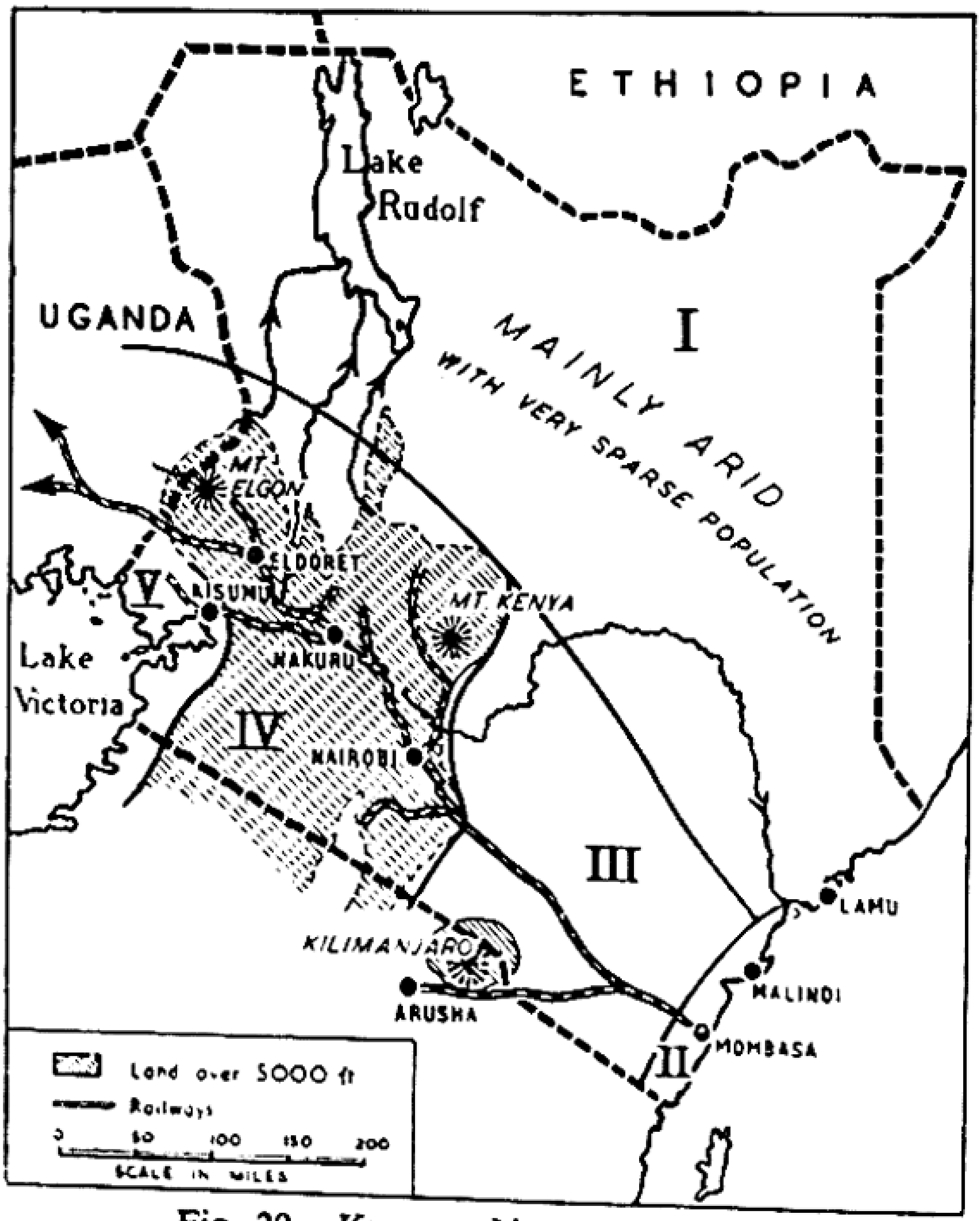


Fig. 20. KENYA: NATURAL REGIONS.
I. The Arid North. III. The Plateau Slopes.
II. The Coastal Lowlands. IV. The Kenya Highlands.
V. The Lake Victoria Uplands.

*Mombasa*, an old Arab port on the eastern side of an island off the coast, has a population of 180,000, of whom 13,500 are Arabs, and 24,000 Indians. The old part of the port still carries on a coastal trade, largely in the hands of Arabs, but on the south-western coast of the island is the sheltered harbour of Kilindini where the largest ships can dock. This provides the main outlet for a vast area of the African plateau including nearly the whole of Kenya and of Uganda, with which it is linked by rail. Exports include raw cotton (mainly from Uganda), coffee, sisal, and hides. Near Mombasa are mills for extracting coconut oil from copra.

THE SLOPES OF THE PLATEAU. The rise to the Kenya Highlands is a gradual one. Behind the coastal lowlands lies an undulating region, mainly below 5,000 ft, with a scanty average rainfall of about 10 in. This is savanna or scrub country, too dry for agriculture, on which African herdsmen, many of them of the Kikuyu and Masai tribes, graze their cattle. The animals are often of poor quality—big-boned zebu cattle with large horns. They are herded at night in enclosures protected by thorn hedges to keep out the many wild animals of the savanna. But here, as in many other parts of Africa, the dreaded tsetse fly carries sleeping sickness—a disease which makes the cattle listless and emaciated so that they eventually pine and die. The Africans, quite naturally, tend to pasture their cattle in the areas least affected by the tsetse. These are often, unfortunately, the least fertile areas where the grass, once grazed closely, does not recover rapidly. One of the main difficulties is the traditional attitude of mind of the native African who regards the number of cattle he owns as more important than their quality. So often there are too many cattle on insufficient pasture. As a result the soil becomes exposed and is liable to be washed away by sudden rainstorms. Large areas in East Africa have been practically ruined as a result of soil erosion caused in this way.

There are, however, some hopes for the future. A new drug, known as *antrycide*, can now be used to inoculate cattle against sleeping sickness. New areas may therefore be opened up for grazing in tsetse infected country.

In this region there are vast game reserves in which the wild animals of the savanna—lions, giraffes, rhinoceros, and antelopes, for example—live in large numbers.

THE KENYA HIGHLANDS. These lie between 5,000 ft and 9,000 ft above sea level and are the most important part of Kenya. They are cut by the Great African Rift Valley (Fig. 19), forty miles wide, which rises on either side from a floor only 1,500 ft above sea level. Much of the plateau is forested and cedar wood is cut in many places for making pencils. Elsewhere there is open savanna country and much cultivation. The chief African food crops are millet, maize, beans and peas, groundnuts, and sugar-cane—all grown on small peasant holdings. For many years a vast area of land in the Kenya Highlands was reserved solely for white settlers, who farmed large estates using African labour. Africans now own and farm over two-thirds of the land in the Highlands, and the output of their farms is increasing. On the higher land wheat is grown, together with some oats and barley. Pyrethrum is an important crop. The parts that are a little warmer and wetter produce maize, coffee, tea, and cane-sugar for export. Herds of superior quality cattle are kept for meat and milk, and a good deal of butter is sent to other African territories.

*Nairobi*, the capital of Kenya, has a population of 267,000, of whom 21,000 are Europeans and 86,000 Asians. The first large town in the Highlands reached by the railway from Mombasa, it is a market centre close to the coffee-growing areas.

*Nakuru*, situated in the Rift Valley, is a centre of white settlement. From it a branch line of the main Mombasa-Uganda railway runs to Kisumu on Lake Victoria.

*Eldoret*, also in the Rift Valley, is a gold-mining centre.

THE LAKE VICTORIA UPLANDS. As the Kenya Highlands slope towards the depression occupied by Lake Victoria, the climate gets warmer and wetter. This is undulating savanna country with much forest. Dotted about are native villages of thatched mud huts within thorn stockades. Maize, millet, and bananas are grown for food, and a little cotton for export. There are also sugar plantations run by Indians.

*Kisumu*, on Lake Victoria, is linked with Mombasa by rail. Steamers run across the Lake to Entebbe in Uganda.

**Trade**

Exports of Kenya include coffee, tea, sisal, pyrethrum, meat, hides and skins, and cotton lint. Imports include cotton goods, metal goods and machinery, motor vehicles, fuel oils and paper. About one-third of the exports go to the United Kingdom, which supplies nearly half of the imports. West Germany also takes about one-fifth of the exports.

## UGANDA

Uganda lies north and west of Lake Victoria. The country is shaped like a saucer, the rim composed of mountains which divide the country from its neighbours—Kenya to the east, Sudan to the north, and to the west the Congo Basin.

The north of Uganda is dry—semi-desert with just sufficient grass and scrub to afford a little grazing for cattle. To the west are the snow-covered mountains of the Ruwenzori Range—the "Mountains of the Moon". Elsewhere the land is similar, in many ways, to the Lake Victoria Uplands on the Kenya side of the Lake. It consists of undulating plateau covered with savanna grassland broken by patches of forest, and dissected in many places by deep valleys.

Uganda is an independent state within the British Commonwealth with a population of 7,200,000 Africans. The people fall roughly into two groups, divided roughly by the River Nile. To the north and east are the Hamitic pastoral people; to the south and west are the Bantu—mainly peasants, owning their own land and growing their own food, sometimes with cash crops in addition. The Europeans number about 10,000—mainly officials, advisers, and teachers; there are also some 82,000 Indians, usually called Hindis, who tend to monopolise the trade of Uganda.

The country is divided into four provinces (Fig. 21). The Eastern Province is the most densely peopled with about 130 people to the square mile. Buganda is the wealthiest and most advanced part of Uganda with the important towns of Kampala and Entebbe. The Western Province is rich in mineral wealth, now being developed rapidly.

In the Northern Province the climate is drier than the rest of Uganda, transport is not good, and it is peopled mainly by cattle-herding tribes.

The country is governed and administered largely through the tribal organisations. In Buganda Province, politically the most advanced region, the people—known as the Baganda—are ruled by a king (Kabaka) with the help of a native assembly (Lukiko) and native ministers.

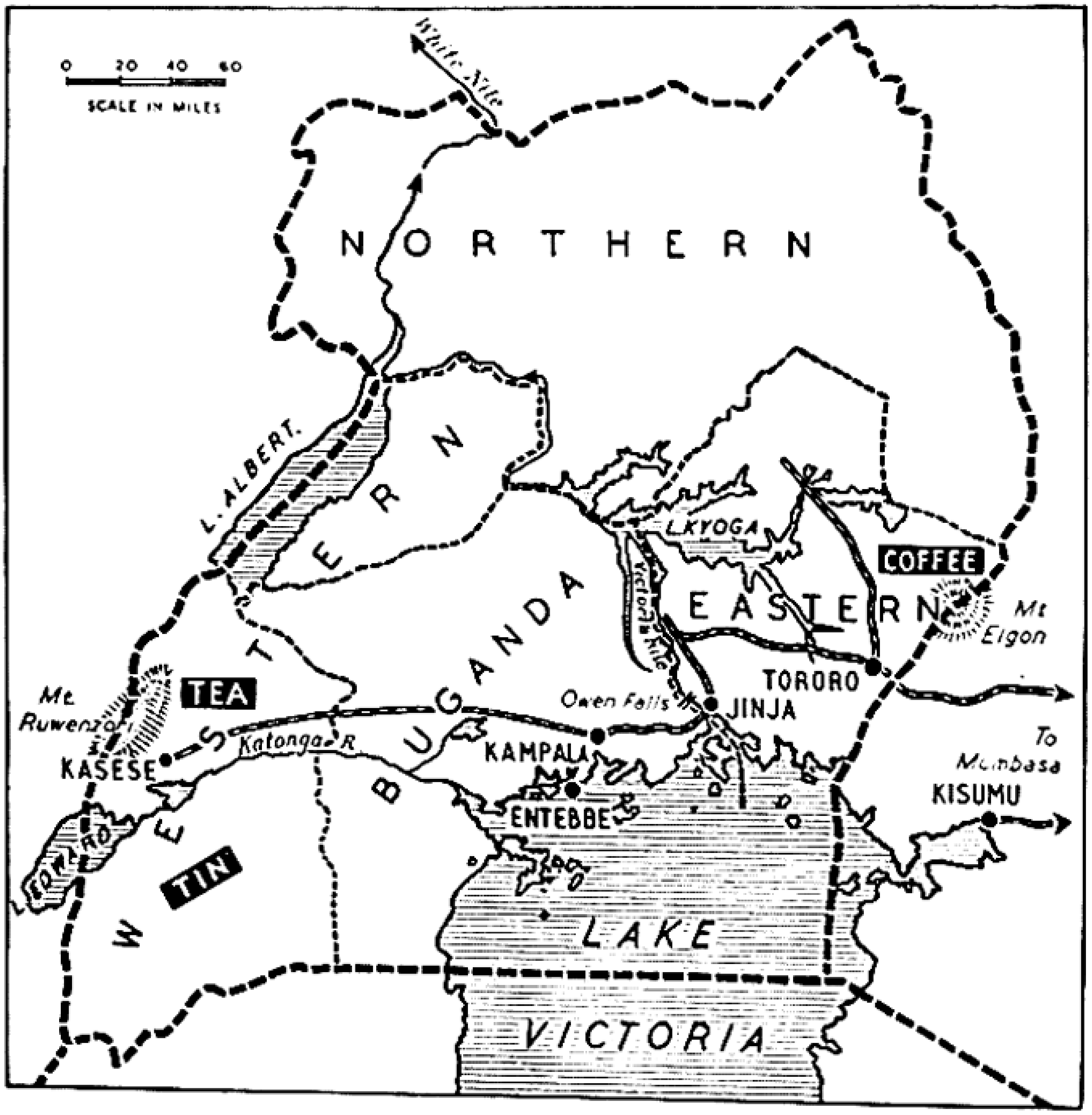


Fig. 21. THE PROVINCES OF UGANDA.

### Climate

Most of Uganda has a very even temperature throughout the year, a good deal cooler than places in corresponding latitudes on the coast of Africa, despite the distance from the sea. This is mainly due to altitude, for most of the country is between 3,000 ft and 4,000 ft above sea level. In the south, Lake Victoria has a moderating influence. The average monthly temperatures of Entebbe, for example, range only between 21° C. (*70° F.*) and 23° *C.* (*73° F.*). Rain falls throughout the year, mainly in the afternoon, with maxima in March and April, and in September and October, when the sun is high in the sky. In the south, the annual average is about 50 in.; further north, about 40 in. The rainfall near Lake Victoria, however, is increased by additional heavy thunderstorms which break early in the day.

**Chief Occupations**

The people of Uganda are mainly engaged in growing crops and keeping cattle. The chief food crops are bananas, groundnuts, and maize. The cattle, as in most parts of tropical Africa, are often the victims of diseases carried by insect pests such as the tsetse fly. Rinderpest takes toll of cattle, especially in Eastern Uganda. This disease is spread by infected wild animals and is therefore difficult to control, but it is fortunately possible to immunise cattle against it and very many animals have been treated. When there are outbreaks of this disease the movement of cattle is restricted. Slowly, new methods of cattle rearing are being adopted in Uganda. Formerly they were allowed to graze freely over large areas; to-day, they are more and more being kept near the homesteads where they are often fed on home-grown fodder. In this way the calves are also more carefully reared and cared for.

As an addition to the normal diet, the Africans near the larger lakes are able to catch fish. Some fish are smoked and salted for export.

*Coffee* and *cotton* are the chief cash crops and provide the chief exports of Uganda. The cotton, which is of excellent quality, with a long staple and fine fibre, is grown mainly in the south and east. Ginneries for extracting the seeds from the cotton, after picking, are scattered all over the area and are at work for eight months of the year. During the busiest season in the cotton areas, local labour is in short supply and thousands of workers from the Congo Basin and the Sudan move in to help.

*Coffee* is grown in the wetter areas, especially on the sloping, well-drained land around Mount Elgon.

*Maize* and *tobacco* are grown for export in Buganda Province. In the Western Province, east of Mount Ruwenzori, there are *tea* plantations.

*Sugar-cane* is grown in plantations owned by Indians on the flat, wet land near Lake Victoria.

### Mining

Uganda is very rich in minerals. The Ruwenzori Range producing copper, cobalt, and uranium. Development of these deposits at Kilembe has been made possible by the extension of the Uganda Railway westward from Kampala. Tin ore is mined in the south-west but production is declining.

Iron ore and phosphate deposits occur in the Eastern Province, near Tororo.

### Industry and Chief Towns

Coal for power has always been difficult and costly to obtain, and Uganda is a long way from the coast so that transport costs on goods for export are high. Industrial development depends largely on a dam at Owen Falls, near Jinja (Fig. 21), which uses the water of the Victoria Nile to generate hydro-electricity. This source of power has made it possible to establish textile mills and cement works, and has resulted in the rapid development of the Ruwenzori copper deposits and the Tororo iron ore and phosphates. Electricity is also supplied to Kenya.

*Entebbe*, a lake port on Lake Victoria, is the capital of Uganda. It has an important airport on the Overseas Airways route from Britain to East and South Africa.

*Kampala* (47,000), the administrative and commercial centre, has a large Asian population. It is linked by railway to Mombasa and many roads radiate from it to serve Buganda and the Western and Northern Provinces. Near Kampala is Makarere College, the University of East Africa.

*Jinja* is situated where the Kenya-Uganda Railway crosses the Victoria Nile near Owen Falls. It is an industrial centre with a copper smelter, sugar mills, and a modern spinning and weaving mill producing cloth from Uganda cotton for sale throughout East Africa.

**Transport and Trade**

The main outlet of Uganda is to the east coast by way of the Kenya and Uganda Railway to Mombasa. From its main stations in Uganda at Kampala, Jinja, and Tororo, roads radiate to serve outlying districts. Steamer services operate on Lake Victoria and on the Albert Nile.

By far the most important exports are coffee and raw cotton. Other exports include copper, cotton seed, tea, and hides.

The exports of cotton and coffee are carefully controlled by the Government which does all the buying and selling. The aim is to protect the growers in two ways: firstly, to prevent too great a demand which might take labour away from the growing of essential food; secondly, to maintain an even price level so that the grower does not suffer from the booms and slumps of world trade.

The chief imports are textiles, metal goods, machinery, and motor lorries.

The trade of Uganda is mainly with Britain, Japan, and Western Germany,

## TANZANIA

Tanzania, or the United Republic of Tanganyika and Zanzibar, lies between the east coast of Africa and the Rift Valley lakes of Tanganyika and Malawi. There is a narrow coastal plain but most of the country is plateau over 3,000 ft above the sea. There is no large extent of high plateau as in Kenya, but near the Kenya border lies Mount Kilimanjaro (19,340 ft), the highest peak in Africa. Towards the south of Tanzania the plateau is lower, rising to 3,000 ft only in the extreme west where the Livingstone Range borders Lake Malawi. The natural vegetation of the plateau, which has a climate very similar to that of the plateau of Kenya, is savanna. Wild animals abound and Tanzania has often been called a "land of big game". Nearly two-thirds of the country is, however, covered with forest, especially in the valleys and on the coastal lowlands.

The Republic of Tanzania is a member state of the British Commonwealth. The African population numbers over ten million—mostly farmers; there are only 23,000 Europeans—fewer than in Kenya. There are some 92,000 Asians, mostly Indians. The most densely peopled parts are the fertile areas around Lake Victoria and in the highlands of the north and east. Central Tanzania is too dry and too ridden with tsetse fly to support many people.

## Occupations and Products

The Africans graze large numbers of livestock on the grasslands of the plateau. Roughly seven million cattle, three million sheep, and four million goats are kept in this way, mainly moving from place to place to find the best pastures. As a result, soil erosion is a serious problem. As in Kenya and Uganda, efforts are being made to improve farm methods. Fine cattle are bred at Kongwa and ranching is being developed to provide beef for export. Large meat-packing plants at Dar-es-Salaam and Arusha prepare canned meats, meat extracts, and hides for export.

Among the crops, *sisal hemp* is by far the most important, making up roughly one-quarter of the total exports. Indeed, Tanzania is the world's leading producer of sisal. It is grown on large estates up to 3,000 acres in extent, many of which lie in Tanga province in the north of the country between the sea and Mount Kilimanjaro. The sisal plants have spear-like leaves which yield the fibre. They are grown from offshoots or cuttings taken from a mature plant, or from the little "bulbils" found near the roots of an old and useless plant. They are spaced in rows, in rotation, and grow throughout the year, continually throwing up new leaves. The leaves are first cut when the plants are three years old and yearly cutting can continue up to ten years—usually during the drier periods of the year. When the fibre has been separated from the pulp of the leaf by machinery, it is hung in the wind and the sun to dry. It is then brushed and baled for export to Britain, the U.S.A., and Canada, where it is used for making rope, twine, sacks, and mats. Many of the sisal estates are owned by European planters, but the sisal growers are Tanzanians.

Coffee is grown extensively by the progressive Chagga tribe on the fertile slopes of Mount Kilimanjaro where the growers have organised over fifty local co-operative societies for buying and selling which are linked to form a Co-operative Union centred on the town of Moshi. Coffee growing is increasing.

Cotton is grown widely but is most important in the Mwanza district south of Lake Victoria. The cotton growers have also founded a co-operative society which bargains with the Indians who own the ginneries which prepare the raw cotton for export.

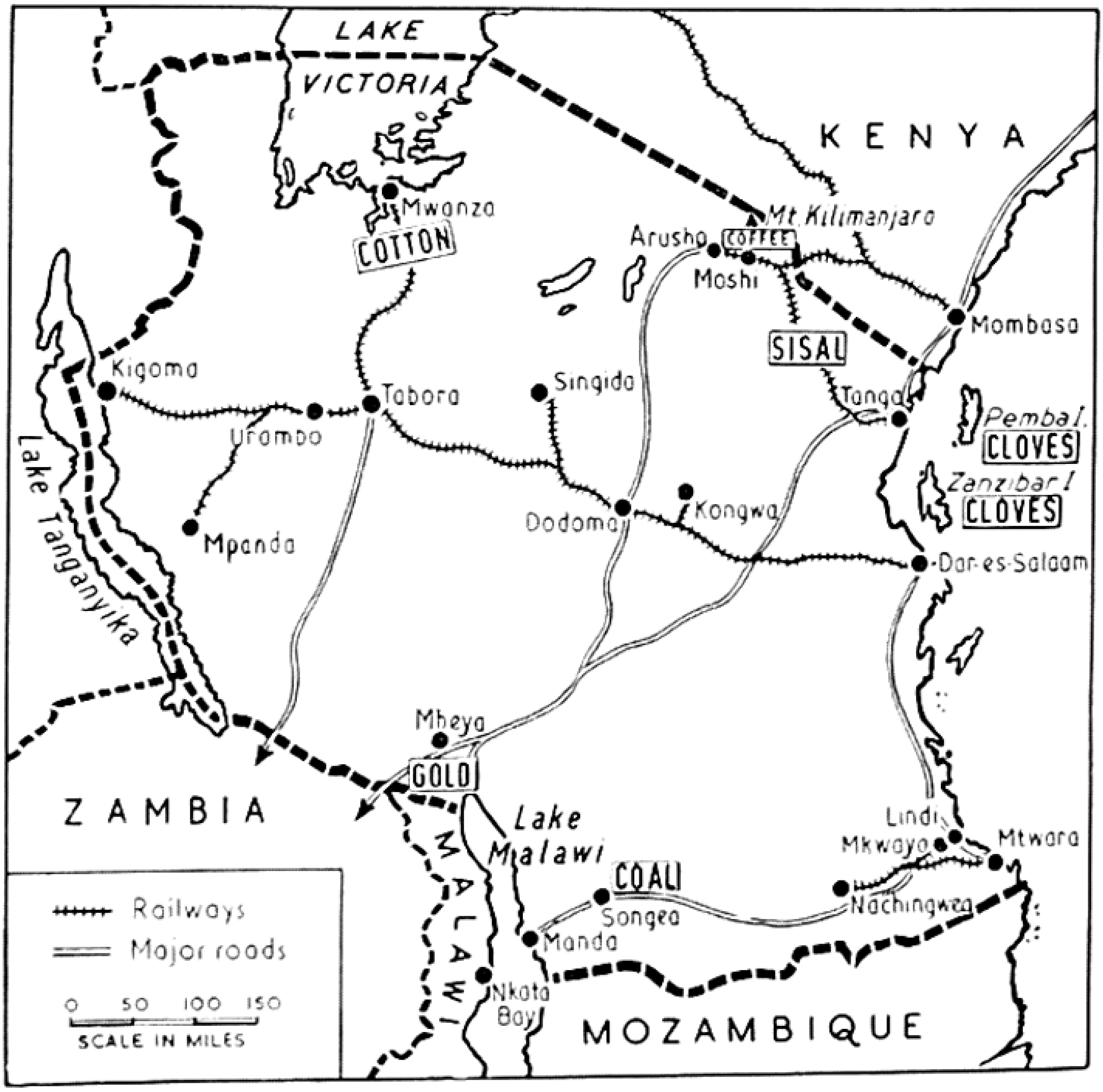


Fig. 22. TANZANIA.

Tobacco is grown at Urambo and other cash crops include pyrethrum, tea, sugar, and oil seeds.

Bananas are a staple food crop in the north of Tanzania and maize is also grown. The cattle have to be kept on the mountain slopes for the plains below are infested with tsetse fly which breeds in the vegetation along the river banks. Fodder for the cattle is carried up the slopes by the women of the tribe, or sometimes by lorry.

Groundnuts have long been grown by Africans for food. The coastal areas of Tanzania produce coconuts, copra, and cashew nuts.

In general, standards of farming in Tanzania are not high with the result that there is serious malnutrition in some areas, especially among children who need more protein—meat, milk, or fish—to enable them to grow up strong and healthy.

### Minerals

Tanzania is rich in minerals but lacks the transport needed to mine them extensively. Gold and diamonds—the most valuable minerals in relation to their weight—have therefore taken first place. Gold is obtained near the northern end of Lake Malawi, and also in the Mwanza district. South of Mwanza, at Mwadui, diamond-bearing gravel and rock is dug with mechanical scoops, after which it is churned up with water so that the heavier material, including the diamonds, sinks to the bottom. The concentrate is then sorted by workers who are housed in bungalows within a barbed-wire fence so that it is impossible to smuggle out the precious stones.

Coal and iron occur in several places in Tanzania. Coal is mined at Songea. Copper, lead, tin, and salt are obtained in small quantities.

West of Tanga, in the northern part of the country, there are iron and steel rolling mills run by an Asian-owned company.

### Transport and Chief Towns

East to west transport in Tanzania is provided by three railway lines:—

(*a*) The Northern Line from Tanga to Moshi and Arusha.

(*b*) The Central Line from Dar-es-Salaam through Dodoma and Tabora to Kigoma on Lake Tanganyika. A branch line runs from Tabora to Mwanza.

(*c*) The Southern Line from Mtwara to Nachingwea.

Other transport, especially from north to south, is provided by roads. The Great North Road, which links Zambia with Kenya passes through Tanzania. There are steamer services on lakes Malawi and Tanganyika.

*Dar-es-Salaam* (130,000) is the capital and chief port of Tanzania. It has a modern harbour with deep-water berths. *Tabora* is a large African town, while *Arusha* and *Moshi*, in the north, are in a highland region. From this area, and nearer the coast, much of the sisal is sent away through the port of *Tanga*.

## ZANZIBAR AND PEMBA

These Islands, made of coral rock, have been a focus of trade routes for hundreds of years and were, at one time, the greatest slave-trading centre in the world. The islands support a population of 300,000 Africans, about 50,000 Arabs, and a few thousand Asians. Before independence the Arabs were the chief landowners, and the Asians handled most of the trade, but the land has now been nationalised and the new policy of Africanisation has made the future of these minorities uncertain. It will be some time, however, before all important positions in the islands can be held by Africans.

The economic life of Zanzibar and Pemba depends almost entirely on cloves, of which these two islands yield the bulk of the world's supply. The clove tree was introduced from the Moluccas early in the eighteenth century and flourished so well that it was cultivated by Arab farmers who used black slaves to till the land and collect the harvest. The trees are dark evergreens, and the cloves are the unopened flower buds which are picked and dried in the sun, either on grass mats, or in concrete drying sheds. At picking times, which occur twice a year, men, women, and children, turn out to gather cloves. The export of cloves and clove oil from Zanzibar and Pemba is worth over £2½ million a year. India and Indonesia are the chief customers.

The demand for cloves is declining and large stocks have accumulated. Prices are therefore low. To provide alternative sources of income more attention is being paid to the growing of cocoa and other crops, and a fishing industry is being developed. Copra is obtained from the coconut palms around the coast, fruit canning is now established, and fisheries are being developed.

*Zanzibar* (58,000), with a waterfront backed by tall, white, flat-roofed buildings, is the chief port. It exports cloves, copra, and coconut oil, and has an entrepôt trade, collecting goods from the mainland for export and distributing imports to the mainland. The chief imports are rice, flour, and cotton and artificial silk piece goods.

## The Trade of Tanzania

Exports of Tanzania include sisal hemp, coffee, cotton, cashew nuts, diamonds, gold, hides and skins, and timber. About one-third of the exports go to Great Britain.

The chief imports are cotton goods, iron and steel goods, and machinery. They come mainly from Britain, India, West Germany, and Japan.

## The East African Common Services Organisation

Certain services such as the railways, civil aviation, posts and telegraphs, and research into such problems as animal diseases and locust control are run jointly by Kenya, Tanzania, and Uganda. They are administered by the East African Common Services Organisation which is under the joint authority of the Presidents of Tanzania and Kenya, and the Prime Minister of Uganda. The countries form a single trade unit or Common Market with virtual freedom of trade between them. There is a standard coinage and the collection of taxes, customs and excise is organised jointly.

The leading exports for 1963 are given below in thousands of pounds sterling.

| | Kenya | Tanzania | Uganda | Total East Africa |
|---|---|---|---|---|
| Coffee .. .. | 11,015 | 6,840 | 27,181 | 45,036 |
| Raw cotton .. | 437 | 10,717 | 14,330 | 25,484 |
| Sisal .. .. | 7,532 | 22,671 | 45 | 30,249 |
| Tea .. .. | 5,665 | 1,552 | 2,041 | 9,258 |
| Hides and skins | 1,168 | 1,672 | 1,044 | 3,885 |
| Diamonds .. | — | 4,948 | — | 4,948 |

### The Future of East Africa

Co-operation under the East African Common Services Organisation has shown the way to even closer association between Kenya, Tanzania, and Uganda. The three governments have expressed their intention to work towards a Federation of East African States, but it may be some years before this goal is reached.

# CHAPTER VII

## MALAWI, ZAMBIA, RHODESIA, MOZAMBIQUE, MALAGASY, AND MAURITIUS

### MALAWI

Malawi (formerly Nyasaland) has a population of over three and a quarter million, and fewer than 8,600 Europeans. It is an independent state within the British Commonwealth.

**Relief**

The country can be divided into two distinct regions:—

(i) The High Tableland west of Lake Malawi, which lies between two rift valleys. To the west of this plateau lies a long narrow trough drained by a tributary of the Zambezi—the River Luangwa; to the east lies the rift occupied by Lake Malawi itself.

(ii) Southern Malawi consists of the valley of the Shiré River, a tributary of the Zambezi which occupies an extension of the Lake Malawi Rift, together with the high land on either side. To the west, the plateau is a narrowing extension of the tableland to the north; on the east lie the Shiré Highlands and, in the extreme south-east of the country, the Mlanje Mountains.

**Climate**

Throughout Malawi convectional rain falls in the hot season between October and April when the sun is overhead, or nearly overhead, and the land has become heated. The main variations of climate depend on altitude, though there tends to be a general increase in rainfall from south to north.

Zomba, over 3,000 ft above sea level, has an average annual temperature of 21° C. (*69° F.*), while Nkata Bay on the western shore of Lake Malawi, only 1,400 ft above sea level, has an average annual temperature of 23° C. (*74° F.*). In both cases the annual range is small.

The annual rainfall at Zomba is 54 in. compared with 66 in. at Nkata Bay.

## Chief Crops

Farming is the chief occupation in Malawi. The chief cash crops are tobacco and tea. Tobacco and cotton are grown by the native Africans; tea is grown on large estates under white direction on the Shiré Highlands around Cholo, south of Blantyre. Malawi is the chief tea-producing country in Africa.

Tung trees are grown for their oil, especially in the Vipya Highlands north-west of Lake Malawi. Groundnuts, maize, and soya beans are important food crops, and bananas are grown for local consumption and for export. The district is also linked by main road with the railhead at Domira Bay.

Other staple foods of the population are rice and fish from Lake Malawi which are dried and stored. Efforts are now being made to increase the output of the fisheries by encouraging fishing in deeper waters.

## Towns, Transport, and Trade

There are few towns of any great importance in Malawi. *Zomba*, the administrative centre, has a population of 7,500. It is served by air and by a road which links it to the nearest railhead in the Shiré Highlands at *Blantyre* (63,000), the largest centre.

The capital of Malawi is to be established at *Lilongwe* and a new university will be built there.

The chief trade route of the country is the railway from the Portuguese port of Beira, in Mozambique. It crosses the Zambezi at Sena, follows the Shiré River into Malawi, crosses it at Chiromo, climbs over the Shiré Highlands through Blantyre before crossing the Shiré River a second time on its way to Domira Bay (Chipoka), on Lake Malawi. The areas near the lake shores are served by steamer services, the chief lake port being Nkata Bay.

The chief exports of Malawi are tobacco, tea, cotton, tung oil, maize, and rice.

Most of the exports go to Great Britain, which provides nearly half the imports, mainly machinery, manufactured articles, and vehicles.

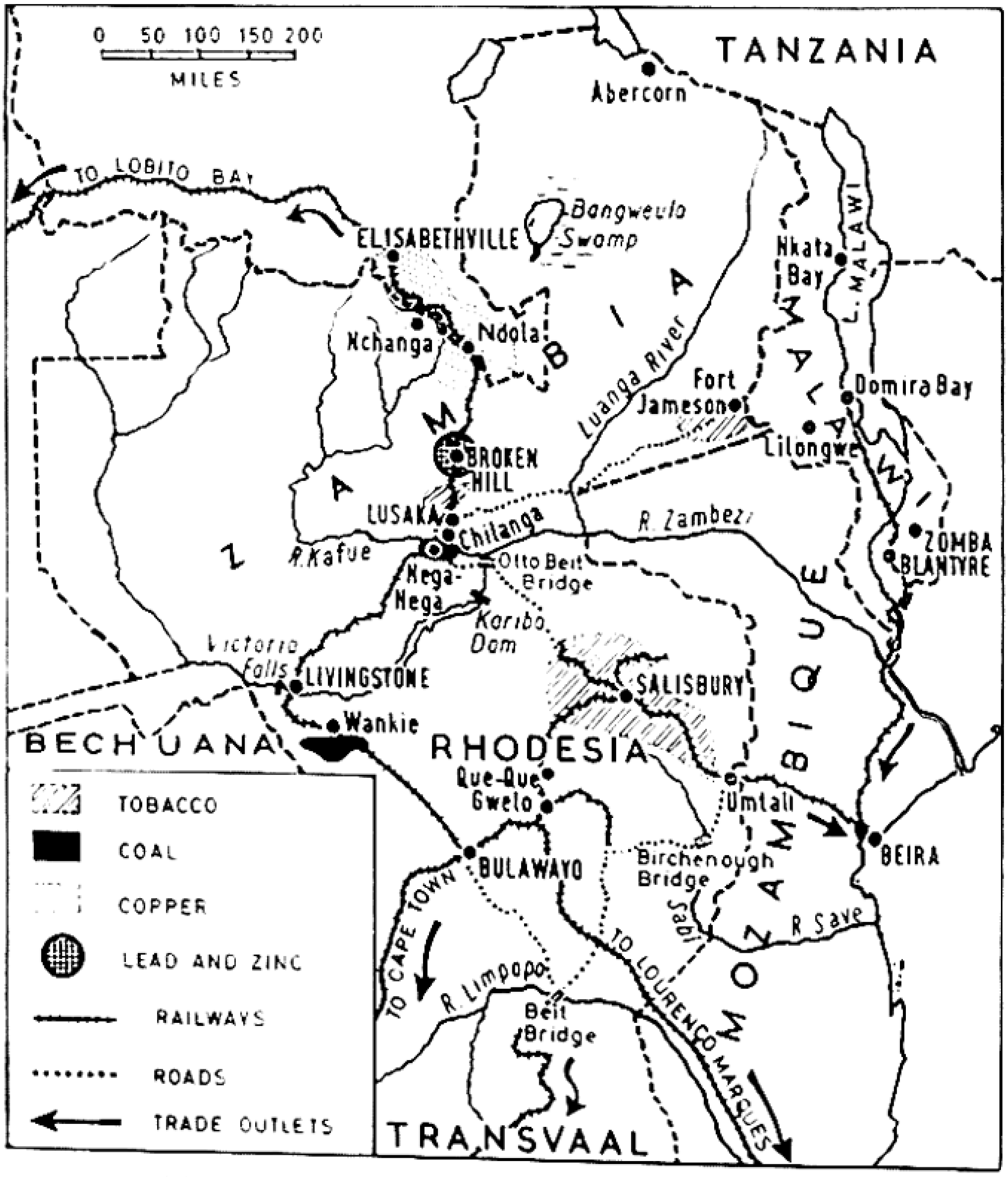


Fig. 23. Malawi, Zambia, and Rhodesia.

## ZAMBIA

Zambia (formerly Northern Rhodesia) is an independent state within the British Commonwealth. It has three and a half million people, of whom 70,000 are Europeans, and about 6,000 Asians.

## Relief

Zambia consists of a rolling plateau, mainly between 3,000 ft and 5,000 ft above sea level, but in the north-east an escarpment, known as the Muchinga Mountains, lies to the west of the rift valley occupied by the Luangwa River, and rises in many places to over 6,000 ft.

Most of Zambia is drained by the Zambezi and its tributaries, of which the River Kafue and the Luangwa River are the largest. The Zambezi forms the southern boundary of the country for over 500 miles. The northern part of the country form a shallow basin in which Lake Bangweulu lies with a vast area of marshland to the south-east. Water from the lake and swamps drains slowly into the River Luapula.

The larger rivers of Zambia flow all the year round but many of the smaller streams dry up altogether in the dry season. The Zambezi is 1,300 miles long but is broken by falls; the most famous are the Victoria Falls—known to Africans as "the smoke that thunders". Just below these falls the river is crossed by a single-track railway which provides the main approach to the country from the south. Three hundred miles downstream, just above the confluence with the River Kafue, lies the Kariba Gorge where a large dam holds back the water for the generation of electricity. The cheap power from this hydro-electric station is distributed over an immense area in Central Africa. Fishing in Kariba Lake is becoming increasingly important.

## Climate and Vegetation

Three distinct climatic periods can be recognised:—

(*a*) *The Hot Season* occurs in September, October, and November as the overhead sun moves south and the land absorbs the heat from its rays.

(*b*) *The Rainy Season* follows from December to April. It is a period of heavy thunderstorms alternating with bright sunshine. The rainfall varies between 30 and 50 in. a year, with the heavier rains in the north.

(*c*) *The Winter*, which extends from May to August with warm days, and cool nights with occasional frosts.

Much of Zambia is savanna land with tall grass and a few trees, but the wetter parts, including the higher land, are well wooded. The more open grasslands are mainly in the south and provide grazing land for cattle.

## Farming

The chief cash crops of Zambia are maize, wheat, and tobacco. Maize is grown mainly in the south. At one time a good deal of wheat was grown under irrigation but wheat growing has fallen off in favour of maize.

The tobacco is of the Virginia-type and grown by both Europeans and Africans in the Fort Jameson area and between Broken Hill and Lusaka.

Rice is a crop which is now attracting more and more interest. There are many areas which flood in summer and are wet enough to grow this crop. Some of the flat areas along the banks of the Kafue river are being reclaimed for agriculture and provided with water for irrigation in the dry season to grow wheat, barley, and potatoes. In the summer rice, cotton, and groundnuts are grown.

The production of food is at present hardly keeping pace with the rapidly growing population. Cattle for meat have to be imported from Bechuana, and butter from Kenya. The crops of potatoes, beans, and groundnuts grown in Zambia are too small to satisfy local needs, but mining is so prosperous that the country can afford to buy food with the money it receives for minerals.

## The Copper Belt

The copper mines of Zambia are by far the greatest source of wealth, providing the bulk of the exports, and over 13 per cent. of the world's output of this metal.

Copper mining became important soon after 1930 when a mineral area was opened up in the extreme north, near to the Katanga copper-mining district of the Congolese Republic. The Nchanga mine is the largest producing copper mine in the world. These mines have provided extremely valuable exports of copper and turned a relatively poor country into one which has been able to afford good public services—roads, schools, and hospitals. In recent years copper output has been worth over £150 million a year. Coal is brought from the Wankie coalfield in Rhodesia, and from a coalfield at Nega-Nega, south of Lusaka. Power and light are now being supplied to the Copper Belt from the Kariba Gorge hydro-electric station on the Zambezi.

A number of the workers in the copper mines live in nearby townships with their families. This has been found to be socially much more desirable than importing migrant labour from a distance since it prevents the break-up of family life and tribal customs, though some workers do come from Malawi.

South of the copper belt, an old-established mining area at Broken Hill produces lead, zinc, and vanadium.

### Towns, Transport, and Trade

The chief towns of Zambia lie along the main railway which winds northwards from Livingstone to the Congolese Republic. Most of the country's wealth follows this "line of rail" (Fig. 23).

*Livingstone* (14,000), near Victoria Falls, is the only large town on the southern border. It has a large airport on the British Overseas Airways route to South Africa.

*Lusaka* (75,000), the capital, is centrally situated in an agricultural area producing maize, tobacco, and groundnuts. Nearby is an international airport.

Cement works at *Chilanga*, south of Lusaka, provide material for building.

*Broken Hill* (60,000) is a lead and zinc mining centre, and *Ndola* (81,000) is the gateway to the Copper Belt.

North of Ndola, the railway continues into the Congolese Republic to Elisabethville which is linked with the port of Lobito in Angola. The main outlet for Zambia's copper is by rail through Salisbury to the Portuguese port of Beira. There are plans, however, to build a line into East Africa to link up with the Tanzania line to Dar-es-Salaam. This would run entirely through African states: the other outlets run through countries under white control. The rest of the country is served by roads. One of the principal roads links Lusaka with Fort Jameson.

The chief exports of Zambia include copper (over 90 per cent. of the total), zinc, lead, tobacco, hides, and timber. Britain is the chief customer, followed by the Republic of South Africa.

Imports include motor cars, mining machinery, and textiles. The total value of the imports is considerably less than that of the exports.

## RHODESIA

The population of Rhodesia, or Zimbabwe as many Africans would call it, is over four million, of whom 219,000 are Europeans. The whites own about half of the land. Over 100,000 Africans from Malawi work in Rhodesia.

### Relief and Climate

As in Zambia, most of the country is high plateau between 4,000 and 5,000 ft above sea level. The main watershed runs from south-west to north-east. The northern parts drain to the Zambezi; to the south a number of rivers drain direct to the Indian Ocean through Portuguese East Africa. These include the Sabi, Lundi, and Limpopo.

As in Zambia, the winters are almost without rain and the warmest weather comes in September and October, before the heavy rains bring the temperature down. The annual rainfall varies a good deal. Western parts (Matabeleland) are dry—with a rainfall of from 15 to 20 in. This is mainly ranching country. In the east (Mashonaland), the annual rainfall is heavier, and on the eastern frontier, where the plateau slopes away to the south-east and faces the prevailing winds, it may reach as much as 60 in. In general, however, the rainfall of Mashonaland varies between 30 and 40 in., providing sufficient moisture for arable farming.

### Farming

The chief grain crop of Rhodesia is maize, grown on the richer land during the rainy season both for human food and for livestock. Small quantities of wheat, oats, and barley, are grown as irrigated crops in the winter. Potatoes and many kinds of fruit—both temperate and sub-tropical—grow well.

Tobacco is the chief money crop and provides the chie export. It flourishes on the lighter soils of the Salisbury district, but is seldom cultivated on the same land for more than two years in succession. Groundnuts, which also need a sandy soil, are often grown in the same districts as tobacco. In all the tobacco-growing areas large barns can be seen; they are as characteristic a feature of the scenery as oast houses are in the hop-growing districts of England. These barns are used for drying the leaf, and large piles of wood are usually stacked beside them for use as fuel—wood that has often been collected from land freshly cleared. The tobacco areas have done well in recent years. The amount that can be grown, however, is limited by available labour as tobacco must be hand-picked. Most of the tobacco goes to Britain.

Cattle are kept throughout Rhodesia on the wide, undulating grasslands, but there has been a tendency to over-graze the pastures with the result that heavy summer rain has, in some places, washed away the soil. Some pigs are kept for bacon, but there are few sheep.

### Minerals

Asbestos is the most valuable mineral of Rhodesia. It is of high quality and commands a good price in world markets. Gold is also mined—mainly between Bulawayo and Salisbury, and chrome ore is important.

There is a very important coalfield at Wankie, in the north-west of the country on the railway line to Zambia which provides good quality coal for the mines (including those in the copper areas of Zambia), for the railways, and for generating electricity. Output, however, is at present limited because the railways cannot handle more. At Que-Que there are deposits of iron and limestone which are used locally in the manufacture of steel. Coal and copper are mined in the Sabi valley.

### Chief Towns

*Salisbury*, the capital of Rhodesia, is a neat, well-planned town on the plateau of Mashonaland, with a population of

320,000, over one-third of whom are Europeans. It is the centre for the tobacco industry and stages the largest tobacco auctions in the world.

*Bulawayo* (183,000) is a city of wide streets, first laid out so that an ox-wagon could turn round. It is an important railway centre; the main line from Cape Province divides at Bulawayo, one line crossing the River Zambezi below the Victoria Falls, the other running north-east to Salisbury. It is the chief industrial centre and has a large motor tyre factory. Salisbury and Bulawayo draw power from the Kariba hydro-electric station on the Zambezi.

*Gwelo* is a small industrial town midway between Rhodesia's two cities.

### Transport and Trade

The main railway linking the two chief towns of Rhodesia —Bulawayo and Salisbury—has many branches which serve the agricultural and mining areas. The Birchenough Bridge across the River Sabi has opened up new districts which are linked by road with Bulawayo. The Otto Beit bridge over the Zambezi at Chirundu carries a road which links Salisbury and Lusaka.

The chief exports of Rhodesia are tobacco leaf, asbestos, gold, chrome ore, hides, and coal. The chief markets are normally Zambia, the United Kingdom, and South Africa. The main outlet for Rhodesian produce is by rail to the port of Beira in Portuguese East Africa.

The chief imports include metals, machinery, and vehicles; textiles, clothing, and yarns; foodstuffs, earthenware, and glassware. These imports come mainly from the United Kingdom and South Africa.

In 1965, the government of Rhodesia declared its independence. This is now regarded as an illegal regime and Britain with many other countries has restricted trade with Rhodesia in an attempt to persuade the Rhodesians to reconsider their action.

## MOZAMBIQUE

Mozambique is the second largest of Portugal's overseas territories. It is about two-thirds the size of Angola. The colony stretches from latitude 10° S. to latitude 26° S. and has a coastline of 1,600 miles. The population is nearly seven million of which some 50,000 are Europeans—mainly Portuguese. Most of the white people are engaged in farming, commerce or Government services. The Africans are mainly agriculturists, though many emigrate to work in the mining areas of the Transvaal and Zambia.

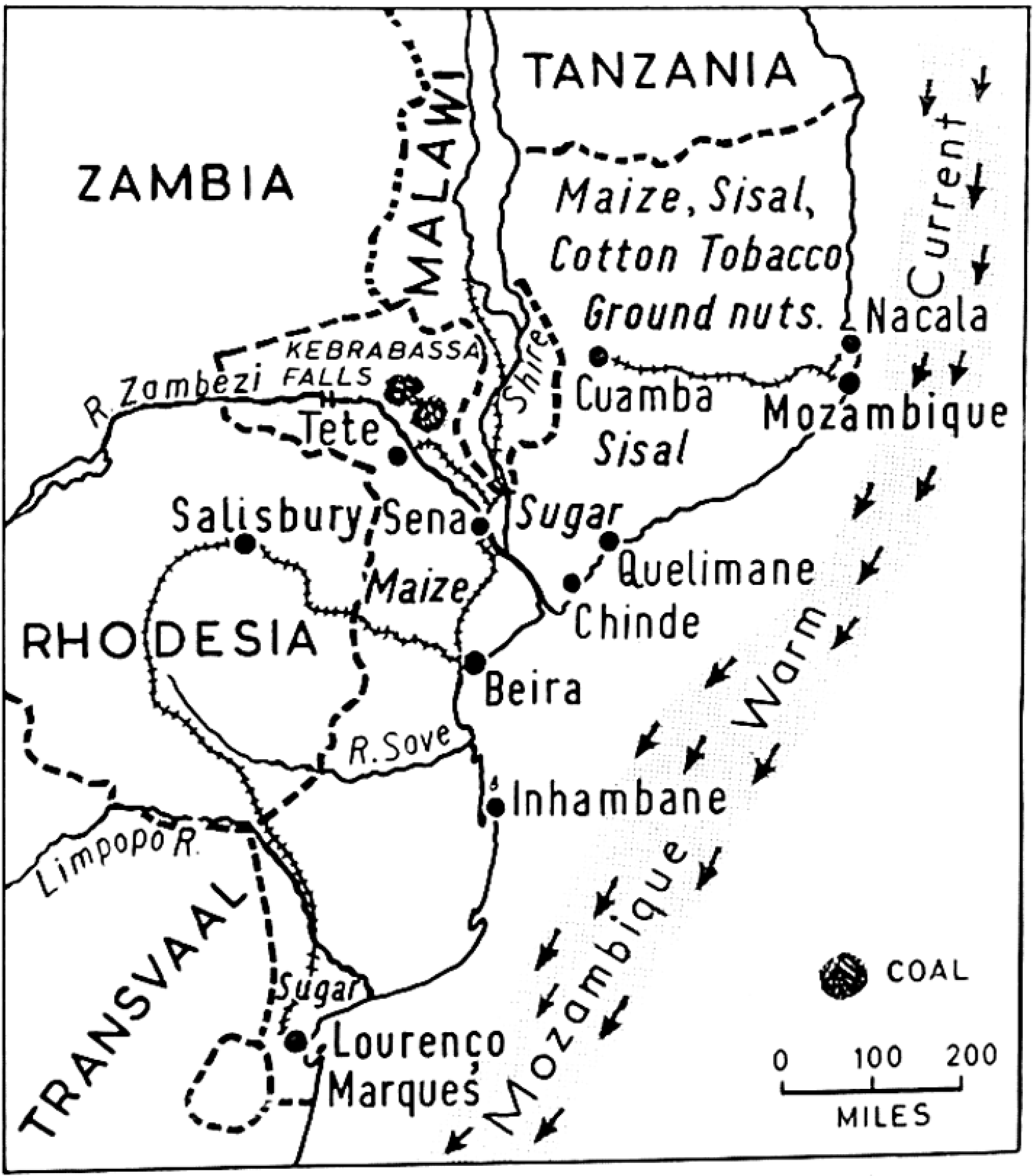


Fig. 24. Portuguese East Africa (Mozambique).

## Surface Features

Mozambique has a wider coastal plain than any other country in Africa, the widest part being south of the Zambezi.

The lowlands are continued inland along the river valleys. The floor of the Zambezi Valley, even 400 miles upstream, is no more than 600 ft above sea level. The highest land lies north of the Zambezi where it flanks the Malawi Rift Valley. Between this high land and the narrow, northern coastal plain is a wide belt of country between 1,000 and 3,000 ft in height.

The Zambezi is the largest river which crosses Mozambique. Its mouth is blocked by an extensive swampy delta. The river has only a limited value for navigation since it is obstructed by the Kebrabassa rapids some 100 miles north-west of Tete, and the volume of water fluctuates with the season. In summer, the lower course of the river is liable to flood, while in winter the level of water is often very low. In the southern part of the country, the Limpopo is also navigable only in summer.

### Climate and Vegetation

There are two major climatic belts in Mozambique—the coastal lowlands and the interior highlands. The warm Mozambique Current which flows southward along the coast gives the lowlands a hot, humid climate. In the interior highlands, temperatures are, of course, lower. The following figures of average monthly temperatures and rainfall for the town of Mozambique are characteristic of the coastal region.

| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Temp. in ° C. | 28 | 28 | 28 | 27 | 26 | 23 | 23 | 24 | 25 | 27 | 28 | 28 |
| Temp. in ° *F.* | *82* | *82* | *83* | *81* | *78* | *74* | *74* | *75* | *77* | *80* | *83* | *83* |
| Rainfall in inches. | 7·9 | 8·7 | 7·4 | 4·4 | 2·3 | 1·0 | 0·5 | 1·3 | 0·5 | 0·1 | 0·3 | 4·9 |

Where there are no highlands near the coast, as in the southern part of the country, rainfall tends to be low and unreliable. Thus, Lourenço Marques has an annual rainfall of about 27 in. and there are often droughts, which sometimes result in a serious failure of the maize crop. To the north, where the highlands are nearer the coast, the rainfall increases;

Beira receives some 58 in. a year. Inland, except on the highest land, rainfalls of less than 30 in. are common.

Much of the coast is fringed with extensive mangrove swamps. Tropical rain forests are chiefly confined to the river valleys and to the lower slopes of the highlands. By far the greater part of Mozambique is clothed with a dry type of savanna, the acacia bush being a characteristic feature.

### Economic Development

Mozambique is primarily an agricultural country. Its rich soil is capable of producing a wide variety of products, but its resources are only partially developed. The most important agricultural commodities are sugar, maize, cotton, copra, and sisal. Manioc and maize are important native foods.

Coconut trees are cultivated on most of the lowlands. Two-thirds of the considerable export of copra is produced on European plantations, the rest by African growers. Factories in Lourenço Marques extract copra oil for export. Coconuts also form an article of diet for the Africans.

Sisal is grown mainly in the north of the country. The industry is expanding and the U.S.A. buys most of the fibre.

Sugar is cultivated both in the Zambezi Valley and also in the drier south. It is refined locally and exported.

Cotton is an important crop—grown by Africans in the north of the colony. A big demand for cotton in Portugal has encouraged the industry.

Owing to the difficulty of obtaining rice from South-East Asia, the cultivation within Mozambique has increased. There is now a surplus for export which goes mainly to South Africa.

Other cultivated crops include groundnuts, manioc, cashew nuts, tea, and tobacco.

Cashew nuts grow wild in most parts of Mozambique. The kernels and husks, which are collected by natives, contain valuable oils. The chief markets are in India and Pakistan.

Timber has become important. Mozambique exports timber to South Africa, Rhodesia, and Zambia.

Cattle rearing is not very important owing to the prevalence of the tsetse fly and cattle ticks, though many natives have herds and one or two are kept by Europeans.

In the south of the country a large area has been opened up for settlement in the Limpopo valley. Bush has been cleared and dams and canals provided for irrigation schemes. Here settlers from Portugal grow wheat, sugar, cotton, maize, rice, and vegetables.

MINING. Although minerals are known to exist in Mozambique, they are little exploited. A small coalfield is worked near Tete but the output is restricted by transport difficulties, since the main outlet is by river boat. The building of the railway from Sena to Tete will speed up development in the area which is believed to have large reserves of coal.

## Chief Towns

The most important towns of Mozambique are ports. Shipping plays an important part in the economy of the colony. Lourenço Marques and Beira, for example, not only serve Mozambique but are outlets for mining and industrial areas in the interior with which they are connected by rail.

*Lourenço Marques* (70,000), the capital, is the chief port of Mozambique and also serves the mining and industrial centres of the Transvaal. It is an up-to-date port with one of the finest harbours in East Africa. The town is growing as an industrial centre. Sugar refining, oil extraction, and cotton ginning are among the industries.

*Beira* is an important port at the eastern end of the transcontinental railway from Lobito in Angola. It is the main outlet for Zambia, Rhodesia, and also deals with minerals exported from the Katanga area of the Congo.

*Mozambique* has always been the outlet for the rich agricultural area in the north, but the new port of *Nacala* now handles a greater tonnage.

*Inhambane*, *Chinde*, and *Quelimane* are mainly concerned with coastal trade.

## Trade

The chief exports of Mozambique include sugar, cotton, sisal, copra, and gold.

Imports are chiefly manufactured goods and petroleum; cotton textiles are the most important single item.

Portugal takes nearly half the exports and supplies about one-third of the imports. The United States and Great Britain between them supply most of the remaining imports.

## THE MALAGASY REPUBLIC

Malagasy is an independent republic within the French Community. The island, formerly known as Madagascar, is about twice as large as Britain and lies in the Indian Ocean, 400 miles off the east coast of Africa. It is an isolated block of the mainland plateau, composed mainly of granite, tilted slightly towards the west. In the east the edge of the plateau is high and the descent steep; towards the west it is gentler.

Malagasy lies in the belt of the South-East Trades and may be divided into three main parts:—

(i) THE EAST COAST REGION where the windward slopes of the plateau receive an annual rainfall of over 100 in., which falls at all seasons of the year, but is heaviest in summer. The slopes are clothed in tropical forests which yield hardwoods and a little rubber. On the few flat areas rice and sugar-cane are grown; and coffee and cloves are produced on the wet hill slopes.

(ii) THE PLATEAU REGION which has hot, wet summers but cool, dry winters. The annual rainfall of Tananarive, which is 4,593 ft above sea level, is 54 in., of which nearly four-fifths falls from December to March. This is open savanna land but the granite soil is too poor for extensive cultivation and the main occupation is cattle rearing.

(iii) THE EASTERN SLOPES OF THE PLATEAU and the western coastal plain are in the rain shadow area and are dry, especially in the south-west where the annual rainfall drops below 20 in. Here the savanna gradually gives place to scrub vegetation. However, cotton and sisal are grown, using water from the mountain streams for irrigation.

Most of the six million people in the island are Malagasies—people of Asian rather than African origin, but in addition to 46,000 French, there are also some Indians, Arabs, and Chinese. The island is almost self-supporting in foodstuffs, mainly rice, manioc, beans, and sweet potatoes.

A little mining is carried on; graphite and gold are produced for export.

*Tananarive* (270,000), the capital and largest town, is in a healthy central position on the plateau and is linked by rail to the chief port, *Tamatave* (50,000). An important air route links Tananarive with France.

The exports of Malagasy include coffee, rice, vanilla, tobacco, sugar, and cloves. Imports include metal goods, motor vehicles, chemicals, and foodstuffs.

## MAURITIUS

This island in the Indian Ocean to the east of Malagasy was originally settled by the French but became British in 1810. English and French are both official languages. Most of the European people are French Catholics. Two-thirds of the population of 725,000 are Indians. There are also some 20,000 Chinese (mostly shopkeepers), and people of mixed origin. It is one of the most densely populated areas in the world with some 1,000 people to the square mile and numbers are rapidly increasing. The country has internal self-government. There is a Governor who nominates a number of members to the Legislative Assembly which is mainly an elected body. There is also a Council of Ministers appointed by the Governor in consultation with the Prime Minister.

Mauritius is near the Tropic of Capricorn and has a hot climate but the sea prevents it from being oppressive. From time to time fierce cyclones sweep across the island, causing damage to life and property. They occur most frequently in January, February, and March.

The chief crop is sugar-cane which covers four-fifths of the cultivated land and provides 98 per cent. of the exports. Mauritius is the largest exporter of sugar to Britain in the Commonwealth. Maize, tea, rice, and tobacco are grown in small quantities, but most of the food is imported.

*Port Louis* (129,000), the capital, is on the north-west coast. It has a good harbour which deals with all the trade of the island, most of which is with Britain or the Commonwealth.

There is an international airport in the south-east of Mauritius at *Plaisance*.

A number of scattered islands in the Indian Ocean are administered as dependencies of Mauritius. The largest of these is Rodrigues, about 350 miles to the east. It has a population of about 20,000 and has pastoral industries. It exports cattle, sheep, goats, and salt-fish to Mauritius. The smaller island groups in the Indian Ocean are mainly of coral and none of them supports more than a few hundred people. Diego Garcia has a good harbour on the main sea route between the Red Sea and Australia.

# CHAPTER VIII

## SOUTH AFRICA

## THE REPUBLIC OF SOUTH AFRICA

The Republic of South Africa consists of the Cape of Good Hope, the Transvaal, the Orange Free State, and Natal. South-West Africa has been administered by South Africa since the close of the First World War. South Africa has now declared its intention of incorporating South-West Africa into the Republic.

### The People of South Africa

The population of South Africa is nearly eighteen million, of whom three and a half million are white. Over twelve million are Africans and there are about half a million Asiatics, and a million and a half coloured people, of mixed racial origin.

THE EUROPEANS. Nearly two-thirds of the white population is of Dutch origin. The first settlers in South Africa came from Holland in 1652. Their descendants speak Africaans, a language akin to Dutch. Just over one-third of the whites are of British origin.

Although British ships visited Table Bay as early as 1591, the first large body of British settlers arrived in 1820. English and Africaans have equal status as languages in South Africa. Among the white population there are also a few descendants of French Huguenots who first came to South Africa in 1688. Names such as Van der Merwe, Smith, and de Villiers, which are very common in the Union, bear witness to the three groups of settlers. More recent emigrants from Europe form a very small proportion of the white population. The majority of the whites are of either British or Dutch ancestry.

THE NON-EUROPEANS form the bulk of the population.

*The Negroes* form the largest group. They are Bantu people descended from tribes which penetrated from the country north of the Zambezi River and drove the Bushmen and Hottentots, the original inhabitants of South Africa, into the desert regions to the west. The Bantu belong to different tribal groups but many of them have become detached from their tribes and have acquired a veneer of white civilisation through their contact with the whites. They form the chief source of manual labour in South Africa, but there are centres of higher education where they may train as doctors, teachers, and agricultural advisers, for service among their own people.

*Asiatics.*—Most of the Asiatic people in South Africa are Indians. They originally came to work on the sugar plantations. Over four-fifths of the Indians live in Natal but there are considerable numbers in the Transvaal and in the Cape Province. Many of them are very prosperous. Some are owners of sugar plantations; others are market gardeners, merchants, or professional men—doctors, lawyers, and teachers. About one-third of the land in the Durban area is owned by Indians.

A small Chinese community lives in the Transvaal. They were brought in to work in the goldfields.

*Coloured People* form a separate group of mixed ancestry—usually part negro and part European. They regard themselves as distinct from the Bantu, and have always tried to identify their interests with those of the white population. Present policy in South Africa makes this increasingly difficult. Coloured people are most numerous in Cape Province.

### Government

South Africa became a Republic in June, 1961, and withdrew from the British Commonwealth. The Government consists of a Senate and House of Assembly. Members of the Government are European and are elected by the European section of the population. However, four members of the Senate and three members of the House of Assembly are elected to represent Native interests. The administrative seat of Government is Pretoria, but Parliament meets in Cape Town.

Each of the provinces of South Africa is administered by a Provincial Council elected by Europeans. The official languages are English and Dutch. "Dutch" is assumed to include Africaans—the mother tongue of most of the whites in South Africa.

### Native Policy

The South African Government believes that the various racial groups, *i.e.* Europeans, Bantu (black), Coloured people, and Indians should be regarded as separate communities living in their own areas in town and country, where each group can pursue its own way of life and develop its own culture. This is the policy known as "separate development". Many people believe that this has resulted from a real fear on the part of the white population that its standard of living might in time be submerged by the larger numbers of African and Asian people.

Special permits are required for a member of any one group to enter the territory assigned to another. Natives who have permission to enter European areas as workers must return to their own territory when their contracts expire. The principle of separation is also enforced by law in factories schools, and other public and private concerns. The Government hopes that, as a result of this policy, the Bantu will consider their territories as national homes, and take a pride in their development and administration. There are eight of these Bantu homelands in South Africa; the largest is Transkei in the south-east of Cape Province which is already nominally self-governing. (Its capital is *Umtata*.) At present they are farming areas, often over-grazed and badly cultivated, with resulting soil erosion. The Department of Native Affairs, consisting of Europeans, advises the native Africans on farming methods, especially in the avoidance of soil erosion, and on the improvement of their cattle. There are also African colleges where agricultural advisers are trained. Very often the African is slow to adopt new ideas and is sometimes even antagonistic. There are European advisers to help the Africans develop any economic resources within their territories which are all relatively poor, over-crowded, and underdeveloped. It will be evident that the ultimate administration of these native territories is in the hands of the Europeans and no African can yet hope to be represented in the Government by one of his own race.

The coloured people are also regarded as a separate community.

Indians, in addition to being segregated, are regarded by the Government as a foreign element in the country. They are not to be represented in the Government. Further immigration has been forbidden and the Government has expressed the hope that as many Indians as possible will be repatriated to India.

## Surface Features

The Republic of South Africa is largely composed of a plateau of ancient rocks with an average height of about 3,000 ft above sea level. The surface is broken by hills of igneous rocks and by flat-topped kopjes which have been carved by erosion from horizontally bedded sandstones. In many parts of the plateau there are veins of minerals. Towards the seaward edges, the rim of the plateau rises and forms ranges of hills which assume the proportions of mountains when viewed from the narrow coastal plain. The eastern rim is the highest: here the Drakensberg Mountains rise to well over 11,000 ft in height. The western edge forms a lower escarpment rising to over 6,000 ft in South-West Africa. To the south, the plateau is flanked by the east-west trending ranges of the Nieuwveld Mountains, the Swartbergen and the Lange Bergen. Between these ranges lie the long, narrow troughs of the Great Karroo and the Little Karroo. A glance at an atlas will show that South Africa has very little land below 600 ft—the coastal plain is very narrow.

The chief rivers draining the plateau are the Orange and its tributary the Vaal, both rising in the Drakensberg Mountains and flowing westward. The Limpopo, which drains the northern part of the Transvaal, is separated from the Orange Basin by the watershed of the Witwatersrand in the Transvaal.

The southern and eastern slopes of the plateau are drained by many short, swift streams. Not one river in the whole country is navigable for any great distance. Sand-bars block the mouths, and most of the rivers have rapids. The falls of the Orange below Upington involve a drop of 400 ft. The rivers draining the plateau carry very little water in winter with the result that they are of little use as sources of power: where waterfalls do exist, the volume of water is so irregular that few can be used to provide hydro-electricity. Much of the western part of South Africa and of South-West Africa has no surface drainage but there are many shallow depressions or *vleis* which hold water for a time after the rains.

### Climate

The greater part of South Africa is well suited for white settlement. Latitude for latitude, South Africa is, on the whole, cooler than similarly placed regions in the Northern Hemisphere. Thus, the average annual temperature of Pretoria (latitude 25° 42′ S.) is 17° C. (*63° F.*), while that of Assuit (latitude 27° 10′ N.) is 22° C. (*71° F.*). This is largely due to the altitude of the South African plateau. Since the plateau rises towards the Equator, average annual temperatures show little variation between the south and the north of the region. Cape Town, with an average annual temperature of 17° C. (*62° F.*), has only one degree less than Pretoria which lies some eight degrees of latitude nearer the Equator. On the other hand, the daily and annual ranges of temperature are much greater on the plateau than on the coastal plains. The

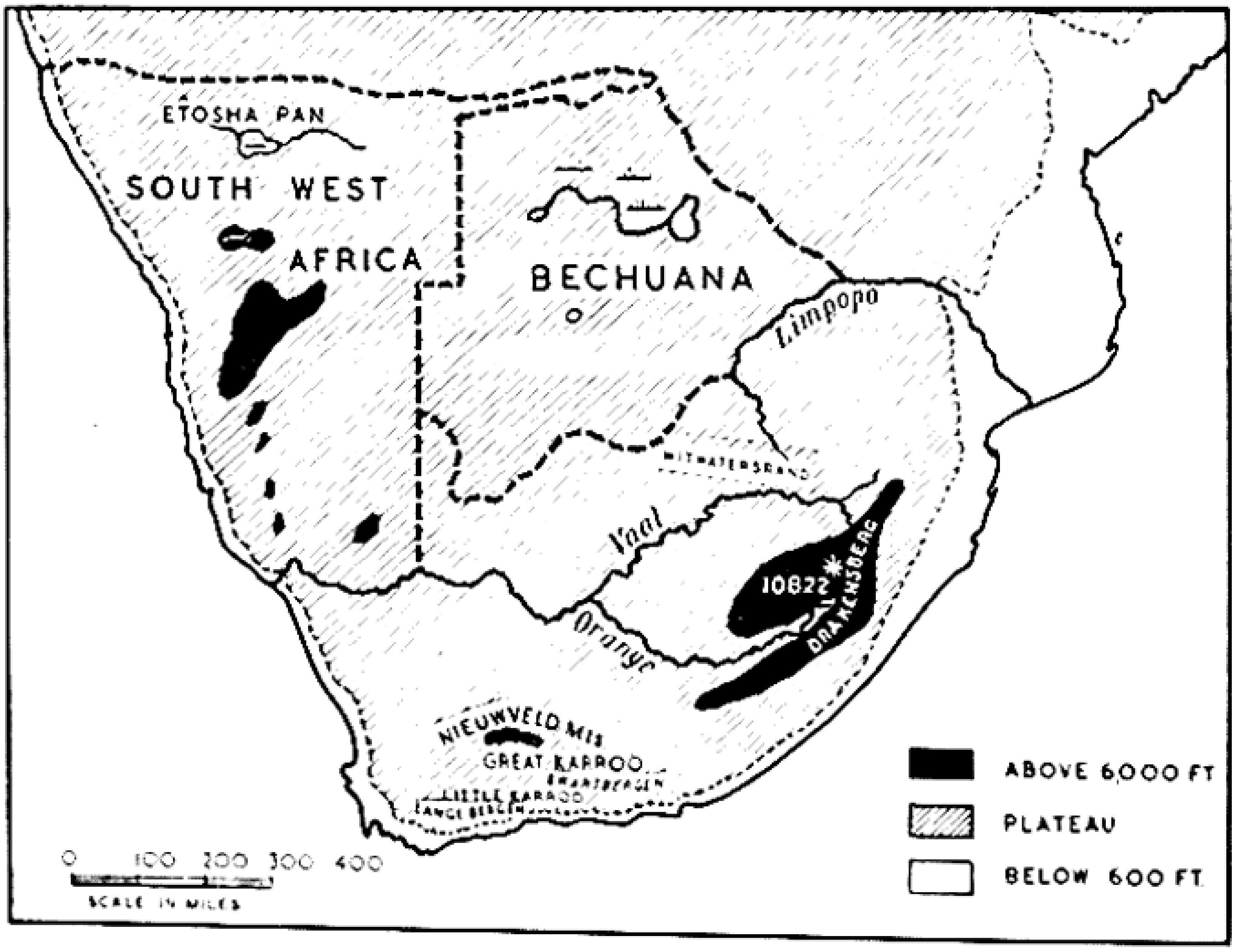


Fig. 25. South Africa: Relief.

average annual range of temperature for Cape Town is 8 C°. (*14 F°.*), while that of Pretoria is 11 C°. (*20 F°.*). Shade temperatures as high as 52° C. (*125° F.*) and as low as – 14° C. (*6° F.*) have been recorded on the plateau, and daily ranges may reach 17° C. (*30° F.*). At any time of the year frosts may occur on the plateau, and severe frosts may do harm to crops in winter. On the coastal plains frosts are unknown.

The effect of the cool Benguela Current off the west coast, and of the warm Mozambique Current off the east coast may be seen by comparing the average annual temperatures of Port Nolloth [14° C. (*57° F.*)] and of Durban [21° C. (*70° F.*)]. Of the two towns, Port Nolloth is situated a little nearer the Equator than Durban.

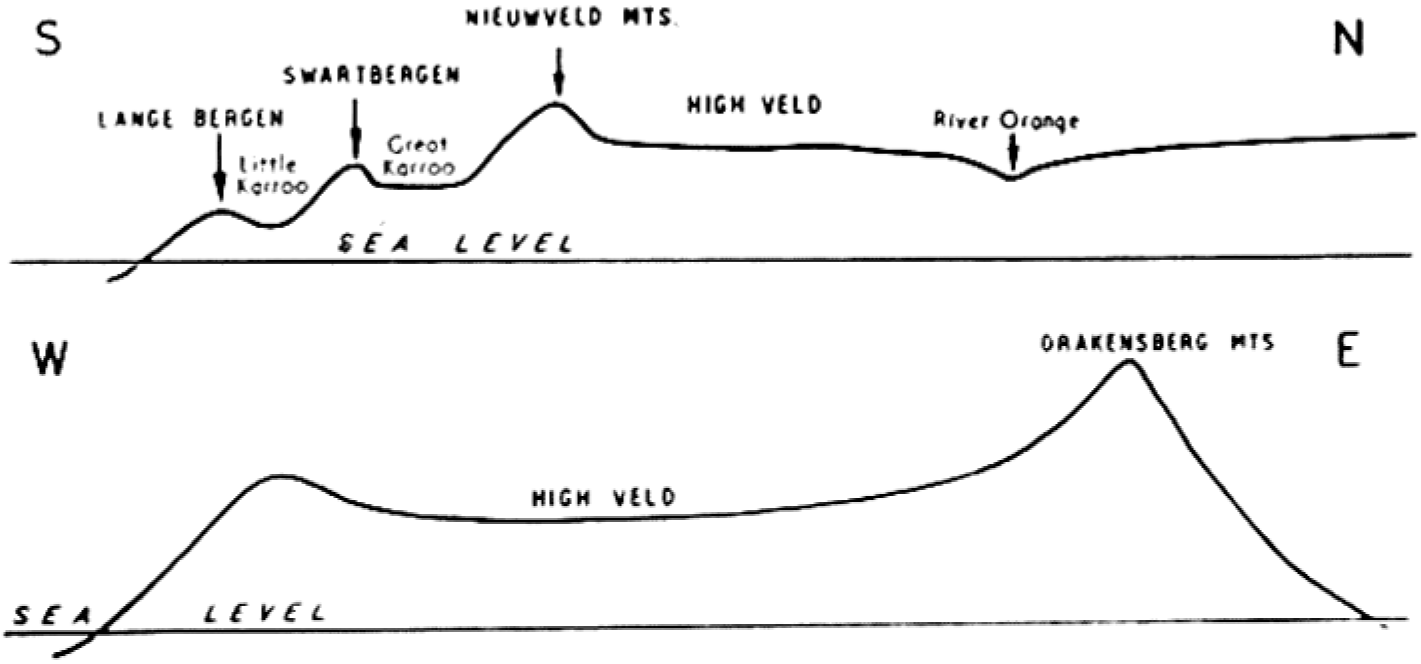


Fig. 26. South Africa: Relief profiles from South to North and from West to East.

Most of South Africa lies in the belt of the South-East Trade Winds which are strongest in summer when the high temperatures of the interior tend to create low pressure which pulls the winds inland. The southern part of the country which lies roughly south of latitude 35° S. has south-east winds only in summer. In winter this area lies in the belt of the north-west winds which move northwards when the vertical sun is north of the Equator (p. 4).

Except for the south-west corner of the Cape Province, South Africa gets most of its rainfall in summer, when the south-east winds are drawn inland. However, the amount of rainfall decreases from east to west. The coast of Natal and the Drakensberg Mountains experience the highest rainfalls and although they have a summer maximum, there is no dry season. West of the Drakensberg Mountains, there is a marked rain shadow area and annual rainfall decreases from about 26 in. at Pretoria to 2 in. at Port Nolloth where arid conditions prevail. The low rainfall of the west coast is also due to the presence of a cool current off shore (p. 7). Very low rainfall is also experienced on the Little Karroo which is a rain shadow area. Oudtshoorn has less than 9 in. of rain annually. Except along the east coast, the amount of rain varies considerably from year to year. Much of it falls in thunderstorms when severe hailstorms often do much damage to crops and cattle. In a country with a small rainfall, the rapid run-off which accompanies thunderstorms is a serious loss of water for the farmer. Most of South Africa is characterised by brilliant sunshine and a lack of clouds. Cape Town enjoys three times as much sunshine as London, while Durban, Johannesburg, and Pretoria have even more. The absence of cloud cover helps to cause the large daily ranges of temperature experienced on the plateau, and to cause much evaporation of the already low rainfall.

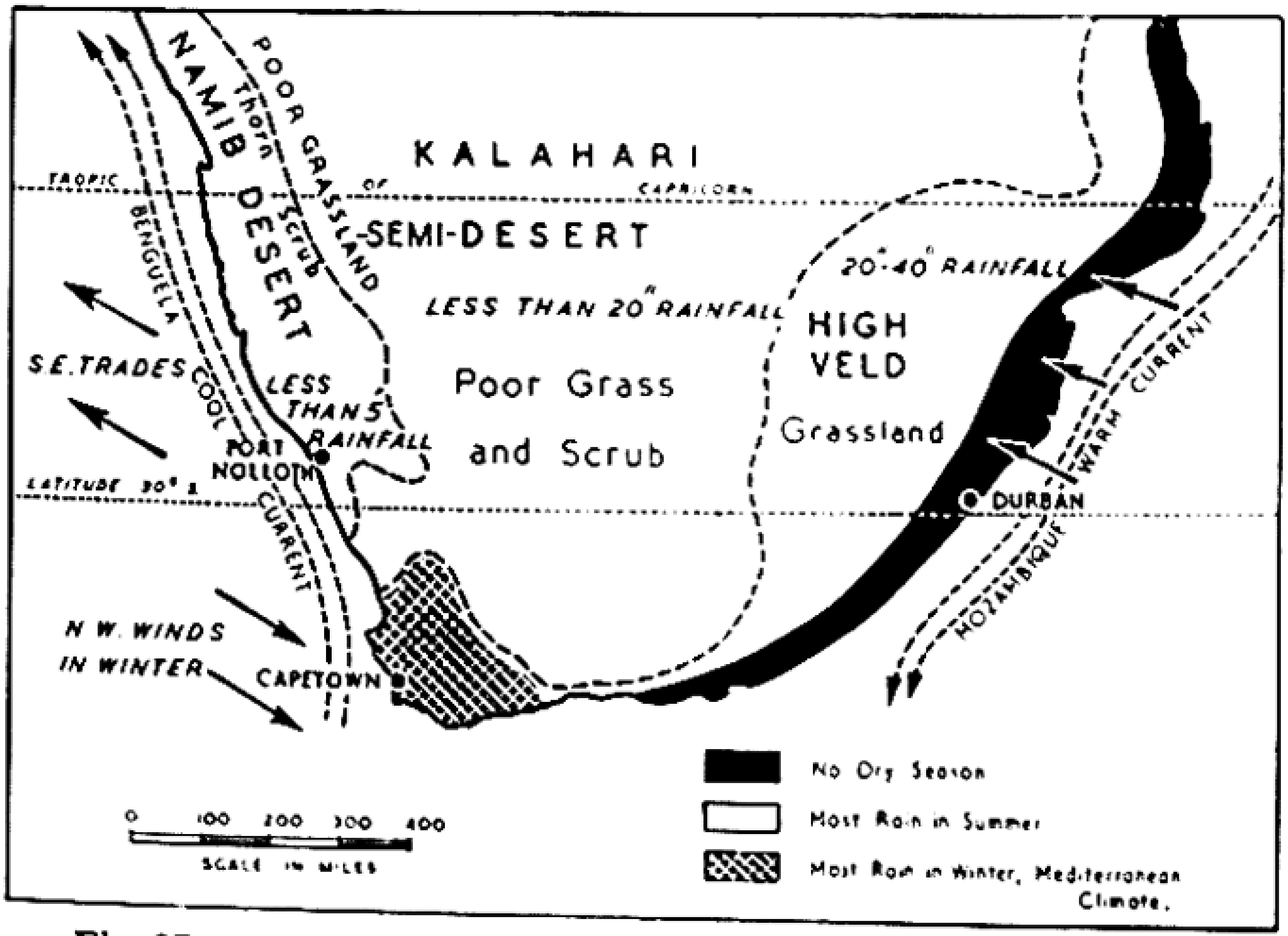


Fig. 27. South Africa: Rainfall and Natural Vegetation.

The extreme south-west of Cape Province receives its winter rain from the westerly winds. It has dry summers and wet winters—characteristic of a Mediterranean climate.

A feature of the coastal areas is the hot, dry, Berg wind which descends from the plateau in spring and summer. Warmed by compression in its descent, it sometimes causes a marked rise in temperature. Dust storms often precede thunderstorms on the plateau, and the cool, damp mists, so dangerous to shipping, occur off the dry south-west coast.

South Africa may be broadly divided into four main climate and vegetation belts based on their seasonal rainfall.

### (i) THE EAST COASTAL AREA OF NATAL.

*Durban:—*

| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Temp. in °C. | 25 | 25 | 24 | 22 | 20 | 18 | 18 | 19 | 20 | 21 | 23 | 24 |
| Temp. in ° *F.* | *77* | *77* | *76* | *72* | *68* | *65* | *65* | *66* | *68* | *70* | *73* | *75* |
| Rainfall in inches. | 4·6 | 4·5 | 4·6 | 3·0 | 2·0 | 0·7 | 0·8 | 2·0 | 3·7 | 4·9 | 4·4 | 4·5 |

### (ii) THE EASTERN VELD AND THE KARROOS.

Kimberley is taken to represent the Veld, and Graaf Reinet to represent the Great Karroo.

*Kimberley:—*

| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Temp. in °C. | 24 | 24 | 22 | 18 | 15 | 10 | 11 | 13 | 17 | 20 | 23 | 24 |
| Temp. in ° *F.* | *76* | *75* | *72* | *64* | *59* | *50* | *51* | *56* | *62* | *68* | *73* | *76* |
| Rainfall in inches. | 2·8 | 3·0 | 2·8 | 2·0 | 0·7 | 0·5 | 0·1 | 0·3 | 0·2 | 0·8 | 2·1 | 2·9 |

*Graaf Reinet:—*

| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Temp. in °C. | 22 | 22 | 20 | 17 | 14 | 12 | 11 | 12 | 15 | 18 | 20 | 22 |
| Temp. in ° *F.* | *72* | *72* | *68* | *62* | *57* | *53* | *51* | *54* | *59* | *64* | *68* | *71* |
| Rainfall in inches. | 1·7 | 1·4 | 2·7 | 0·9 | 1·2 | 0·4 | 0·2 | 0·7 | 1·3 | 0·9 | 2·5 | 1·4 |

(iii) THE MEDITERRANEAN REGION OF SOUTH-WEST CAPE PROVINCE.

*Cape Town:—*

| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Temp. in °C. | 21 | 21 | 20 | 17 | 15 | 13 | 13 | 13 | 14 | 16 | 18 | 19 |
| Temp. in °*F*. | *69* | *70* | *68* | *63* | *59* | *56* | *55* | *56* | *57* | *61* | *64* | *67* |
| Rainfall in inches. | 0·7 | 0·6 | 0·9 | 1·8 | 3·9 | 4·4 | 3·5 | 3·3 | 2·2 | 1·6 | 1·1 | 0·8 |

(iv) THE WESTERN ARID REGIONS OF SOUTH-WEST AFRICA AND NAMAQUALAND.

*Port Nolloth:—*

| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Temp. in °C. | 15 | 16 | 15 | 14 | 14 | 13 | 13 | 12 | 13 | 14 | 15 | 16 |
| Temp. in °*F*. | *59* | *60* | *59* | *58* | *57* | *55* | *55* | *54* | *55* | *58* | *59* | *60* |
| Rainfall in inches. | 0 | 0·1 | 0·2 | 0·2 | 0·4 | 0·3 | 0·2 | 0·4 | 0·2 | 0 | 0·2 | 0·1 |

**Natural Vegetation**

(i) The natural vegetation of the coastal area of Natal is palm forest. This merges into grassland as one approaches the Drakensberg Mountains which are themselves forested. Here the wattle tree (acacia), introduced from Australia, is of economic importance as a source of tannic acid.

(ii) The veld is a temperate grassland with scrub in the drier areas. To the west, as the rainfall decreases, the natural vegetation deteriorates into the poor grassland and thorn scrub of the Kalahari. The Little Karroo is poor scrub land.

(iii) The "Mediterranean" region of Cape Province was once forested with warm evergreen forest containing cedars and cypresses similar to those of the Barbary States. Most of the trees have now been cut down and evergreen shrubs are the characteristic vegetation.

(iv) The desert of Namaqualand and the Namib Desert of South-West Africa have a very scant cover of drought-resisting plants. Belts of sand dunes fringe the coast.

**Farming: Pastoral**

Much of South Africa is covered by temperate grassland with scrub in the drier areas. Vast areas are therefore well suited to cattle rearing which is the chief occupation of the native Africans. The most valuable areas have a rainfall of 20 in. a year but, even in these districts, rivers have to be dammed to provide water in the dry season, and in some years pastures fail through drought.

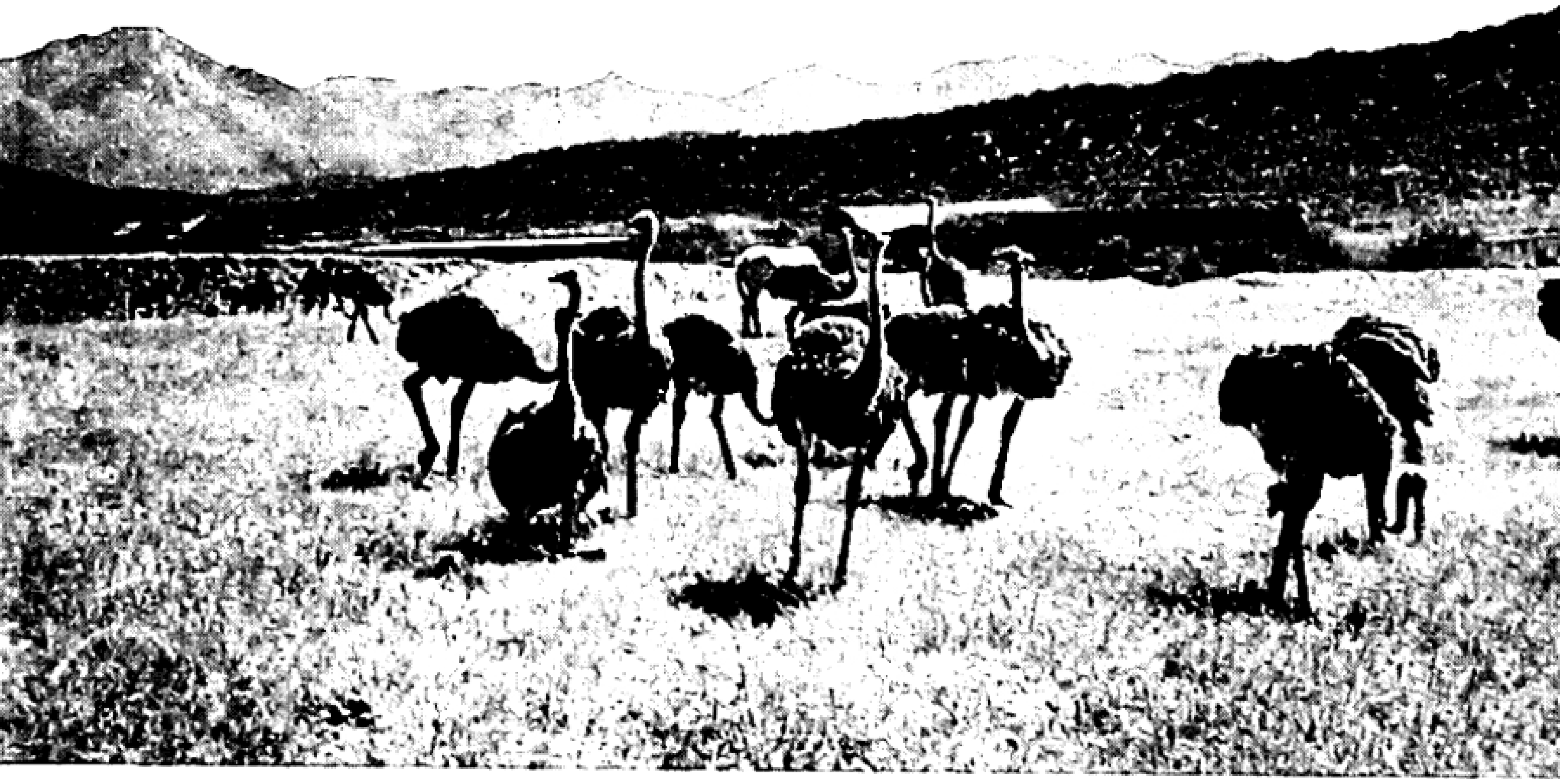
In the African reserves, wealth is still reckoned by the numbers of cattle; numbers are more important than quality. Native cattle are a hardy, hump-backed variety, chiefly used for transport and for the production of hides. In South Africa there are few horses, because they are very liable to disease, cattle are widely used as draught animals on the farms.

On the farms run by Europeans, not only have the native breeds of cattle been improved, but European breeds have been introduced. These cattle are the chief source of milk and meat.

Dairy farming is carried on in many places, particularly in the eastern and southern coastal regions; on the veld where the water supply is adequate; and in the irrigated parts of Cape Province. Creameries make butter and cheese which is not only sufficient for the needs of the country, but sometimes provides a surplus for export—particularly of butter.

Cattle ranching for beef is carried on in many areas, especially in the Northern Transvaal and in Griqualand. South Africa meets its own requirements in beef and at one time there was a surplus for export, but for many years there has been no export of beef, though hides and leather are sent away.

Sheep are very important in South Africa which ranks fourth among the world's wool producers. Wool is the most important agricultural export; over R. 115 (£57½) million worth was sent abroad in 1963. Merino sheep, hardy, adaptable animals originally introduced from Australia, provide most of the wool. They are extensively reared in the drier areas of the Karroos where herbage consists mainly of small shrubs; fodder grown by irrigation supplements their food. They are also reared in the hot, dry country of Northern Cape Province and in the foot-hills of the Drakensberg Mountains at 6,000 to



*Above:* CAPE PROVINCE. OSTRICHES. (*South African Railways and Harbours.*)
*Below.* TRANSVAAL. ZEBRA AND WILDEBEEST IN KRUGER NATIONAL RESERVE. (*South African Railways and Harbours.*)

*Above* Natal Cathedral Peak, Drakensberg (*South African Railways and Harbours*)
*Below* Cape Province Picking and Packing Table Grapes (*South African Railways and Harbours*)

7,000 ft above sea level where snow falls heavily in winter. Most of the wool from South Africa is sent overseas but attempts are being made to develop a wool manufacturing industry at home. Mutton is also produced for home consumption.

Goats are reared in many areas and provide valuable hides for home use and export. The Angora goat which thrives in the dry Karroos produces mohair mostly for overseas markets.

Poultry farming is important in most parts of the Union and many eggs are exported.

Ostriches have long been reared on the Little Karroo where lucerne grown by irrigation is used to feed them. At one time ostrich feathers were a valuable export but changes of fashion led to a decline in the industry. However, there is still an export trade in ostrich plumes. The centre of the industry is Oudtshoorn on the Little Karroo. Here the feathers are collected and prepared for shipment abroad through Port Elizabeth.

### Arable Farming

In South Africa, where there is a considerable variation in altitude, rainfall, temperature, and soils, there should be a wide range of crops. However, much of the country is unsuitable for cultivation. This dearth of good arable land is due to the poorness of the soil which is generally deficient in phosphates, and to the low and erratic rainfall experienced over much of the country. Only in Natal can there be said to be an adequate rainfall, and even here there may be dry spells, particularly in winter. On the plateau, irrigation is made difficult because the streams carry very little water in winter and many rivers have deeply cut valleys which tend to drain the water from the land. However, much land is irrigated and there are plans to dam the Orange River near Bloemfontein to provide water and electricity for a vast area of the plateau. Irrigation is an important aid to fruit growing in the Cape Province and to the dairy farming in the hinterlands of Port Elizabeth and East London. Soil erosion, particularly on the native farms, has done much damage in South Africa. The Government is taking active steps to reclaim land where possible and to prevent further erosion.

Maize is one of the mainstays of South Africa. It is an essential part of native diet and an important animal feed. In good years there is a considerable export of maize but the surplus fluctuates in amount from year to year.

Maize is grown in most areas of suitable relief where the rainfall is over 20 in. per annum. The areas of most extensive cultivation are on the veld in the Transvaal and the Orange Free State, and the drier areas of Natal between the wet coastal plains and the mountains. Maize is the chief crop in the native reserves.

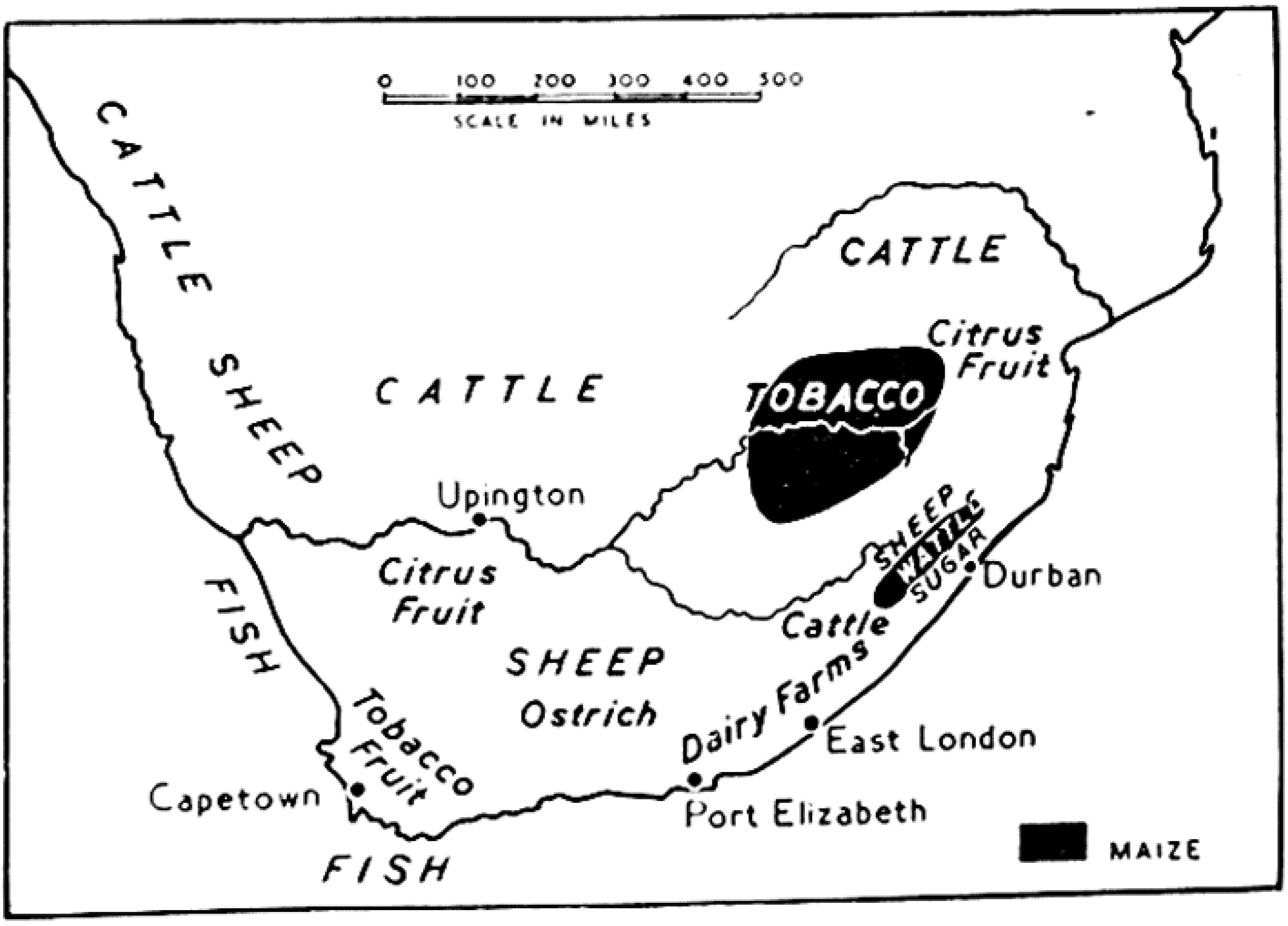


Fig. 28. SOUTH AFRICA: CHIEF AGRICULTURAL PRODUCTS.

Wheat is a winter crop confined mainly to the winter rain area of the Cape Province, though some is grown under irrigation in the Orange Free State. Oats, barley, rye, sorghum, and lucerne are grown as fodder crops.

Fruit farming in South Africa began in the "Mediterranean" region of Cape Province. One of the earliest fruit farmers was Jan van Riebeeck, the Dutch founder of Cape Town who introduced various types of fruit after his arrival in 1652. Now fruit growing has extended to many parts of the Republic and it is the most valuable export crop.

The south-west of Cape Province is still the chief fruit-growing area. The winter rains and dry, sunny summers characteristic of a "Mediterranean" climate, are very favourable to the cultivation of soft-skinned fruits. Irrigation is also frequently used. Nearly all the grapes, apples, peaches, apricots, and pears grown on a commercial scale in South Africa are from within 120 miles of Cape Town, which exports fresh fruit, dried fruit, jams, tinned fruit, and wine.

Vines are widely cultivated in the area. January and February are the harvest months when hundreds of pickers are employed. Most of the grapes are made into wines and brandy. One of the largest distilleries in South Africa is situated at Paarl. This is a co-operative concern supported by wine farmers. Dried fruits, such as raisins, sultanas, and currants are also prepared from the grape crop. The fact that South Africa is comparatively near to the European market compared with Australia, makes the export of fresh fruit possible. Grapes represent about half of the fresh fruit produced and pears about one-third. Many South African pears are sold in Britain in spring.

Citrus fruits have a wider distribution than vines and are usually cultivated in frost-free areas where there is irrigation. They are produced in the Cape Province; Graaf Reinet on the Great Karroo is an important centre. There is also an extensive cultivation of citrus fruits in the irrigated area of Upington on the Orange River, and round Zebediela in the northern part of the Transvaal. Oranges and grapefruit are the most important but lemons and mandarins are also grown. Next to wool, citrus fruit is the most valuable of South African primary agricultural exports. Cape Town, Port Elizabeth, East London, and Durban all have pre-cooling chambers where the fruit is stored before shipment. Pineapples are produced in Cape Province and in Natal where tropical fruits such as bananas and mangoes do well. These are consumed locally. Vegetables are grown for canning and drying in many areas.

Tobacco is grown extensively in the irrigated areas of the Transvaal round Pretoria and Rustenburg.) It is also produced near Pietermaritzburg in Natal, and in the southern coastal areas of Cape Province. It is used in tobacco and cigarette factories.

Cotton growing was once thought to be capable of large-scale development in South Africa since it is not so susceptible to drought as maize and tobacco. However, there is a risk from frost and the former high hopes have not been realised. The Transvaal and Natal are the chief producing areas, but small amounts are grown compared with other cotton-producing countries, though output is increasing. South Africa does not produce enough raw cotton for her growing textile industries and considerable quantities are imported.

The production of sugar-cane is confined to the coastal plains of Natal and Zululand (cf. Queensland, Australia) where there is a humid, tropical climate. It is the chief agricultural product of this region and is grown by both European and non-European growers. In spite of the heavier rainfall of this area, irrigation plays an important part in sugar cultivation since it protects the crop against dry spells. Originally, most of the workers on the sugar plantations were Indians who were brought to South Africa for this purpose. Now there is a tendency to replace Indians by African labour. There are some small mills in the country among the cane-fields but the larger factories are concentrated in and around Durban, which is the centre of the sugar industry and the chief port. Other agricultural crops of Natal include cereals, especially maize. Groundnuts are grown on some of the farms on the veld.

Although hardly an agricultural product, wattle bark ranks high in importance among the produce of Natal. Wattle, a type of acacia native in Australia, grows in plantations on the side of the Drakensberg Mountains at altitudes between 2,000 and 3,000 ft where mists help the growth of the trees. In ten years the trees are mature and whole plantations are cut and the bark stripped from the trees. The wattle plantations stretch through Natal from the borders of Zululand to the borders of Cape Province. Pietermaritzburg is the centre of the industry. Both the bark and a brown resinous extract obtained from it are in great demand for tanning leather.

**Fishing**

The rich fishing grounds from the Cape coast to Walvis Bay provide for an expanding fishing and fish-canning industry.

The export of tinned crayfish and pilchards is important but most of the catch is reduced to fishmeal. South Africa is the largest exporter of fishmeal in the world. A recent industry is the extraction of shark liver oil. Durban has factories which deal with the products derived from the whaling industry. There are other centres of the whaling industry at Cape Town and in South-West Africa.

### Minerals

Minerals are the chief wealth of South Africa. These occur in lodes or veins where they have been deposited by hot liquids and gases forced upwards from below the earth's crust by igneous activity. Several varieties of minerals usually occur in the same veins. When these are exposed at the surface, rivers and other denuding agents break up the rocks and the minerals are carried away in river gravels. The gravels are mixed with water in a shallow pan and moved with a circular motion which causes the heavier minerals to collect near the centre of the pan, while the lighter material tends to be washed over the edges. By repeating this process several times the minerals are concentrated in the pan. This process is based on the fact that most minerals are relatively heavier than the rocks in which they occur. On the whole, panning is a wasteful method since the minute portions of mineral are lost with the lighter material. This method is known as alluvial or placer mining. Lode mining, by which the ores are mined directly from the veins and treated in large, modern plants is far more efficient.

Gold is produced in larger quantities in South Africa than anywhere else in the world. In 1866, gold was discovered in the Witwatersrand (or Rand) area and Johannesburg was founded as the centre of this gold-mining region. The ore is brought to the surface, crushed, and treated with cyanide in the reduction works. Most of the underground work is done by Africans under European supervision. More Europeans work in the extracting plants above ground, but even here the manual work is done by Africans.

The power to work the Witwatersrand mines is provided by a coalfield situated near Witbank, some 80 miles north-east of

Johannesburg. Water is supplied from the River Vaal which is dammed a few miles upstream from Vereeniging.

The African workers in the Rand come from far afield—from Lesutho, Swaziland, and Bechuana, and even from Mozambique, Malawi, and Rhodesia. They work for a period on contract and then return to their kraals. While under contract, housing, food, and medical attention are provided and good wages are paid. These wages succeed in attracting the labour, but migration to the mines has a disrupting effect on family life. Conditions in the Rand contrast with those in the Katanga mining area of the Congolese Republic where housing is provided near the mines for the families of the African workers.

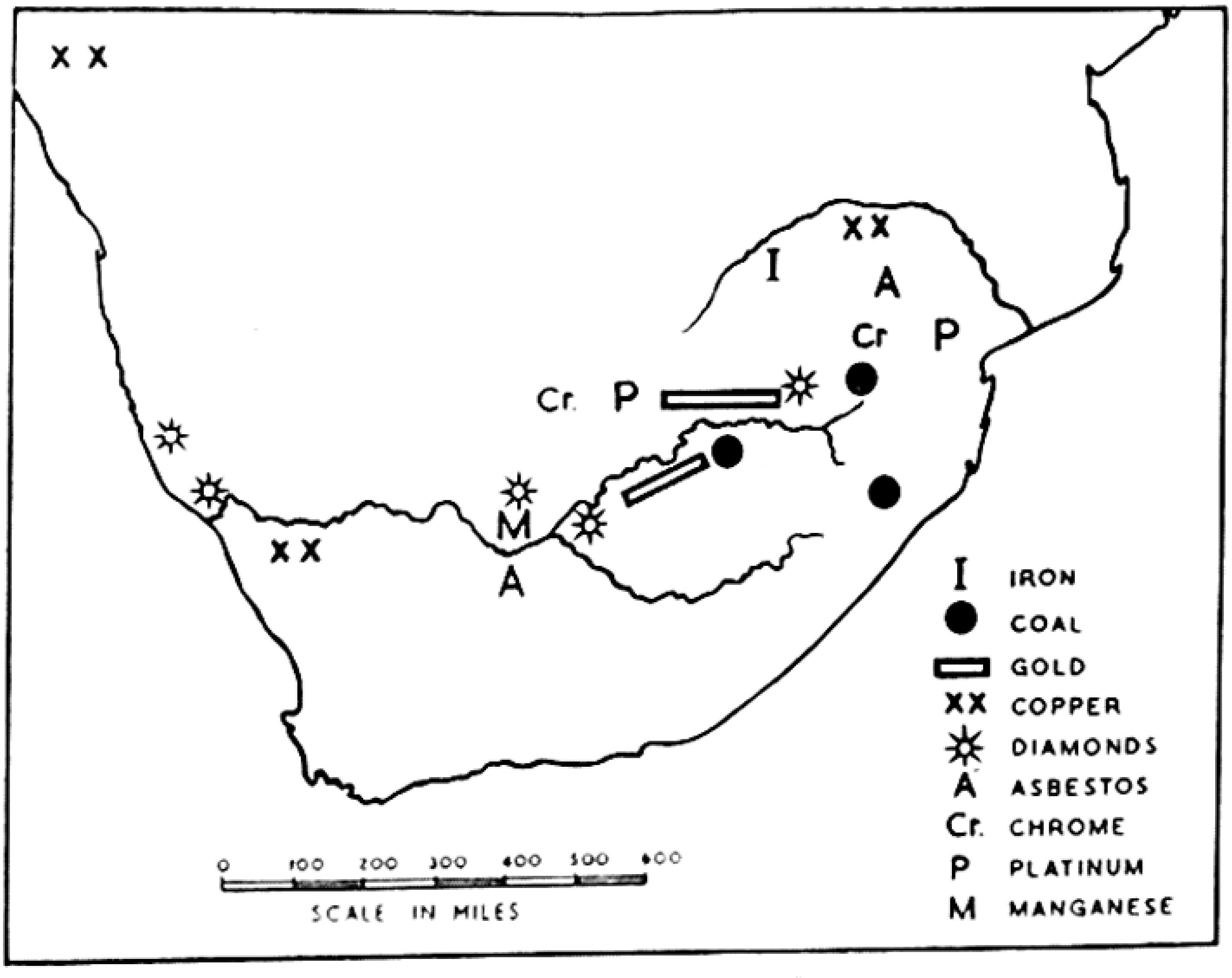


Fig. 29. SOUTH AFRICA: MINERALS.

In the early 1930's the gold industry was concentrated entirely in the Rand area of the Transvaal in a strip 60 miles long. Today, the goldfields form a "golden arc" nearly 300 miles long with over fifty large mines extending into the north of the Orange Free State where there are many rich mines centred on the town of *Welkom* (100,000) (Fig. 30).

Most gold-bearing reefs in South Africa contain uranium, which is now one of the chief exports (Fig. 30). Other minerals such as silver, osmiridium, and pyrites are also extracted as by-products.

Diamonds occur as crystals in necks of volcanic rocks. They are the hardest mineral known and have great value as abrasive and cutting tools. Clear stones are used as gems. Diamonds were first obtained from alluvial workings and are still obtained in this way in the valleys of the Orange and Vaal Rivers. The most important concerns, however, are the mines near Kimberley in Cape Province, and the Premier Mine near Pretoria, where the famous Cullinan diamond was found in 1905. As in the gold mines, the work is done by Africans under white supervision.

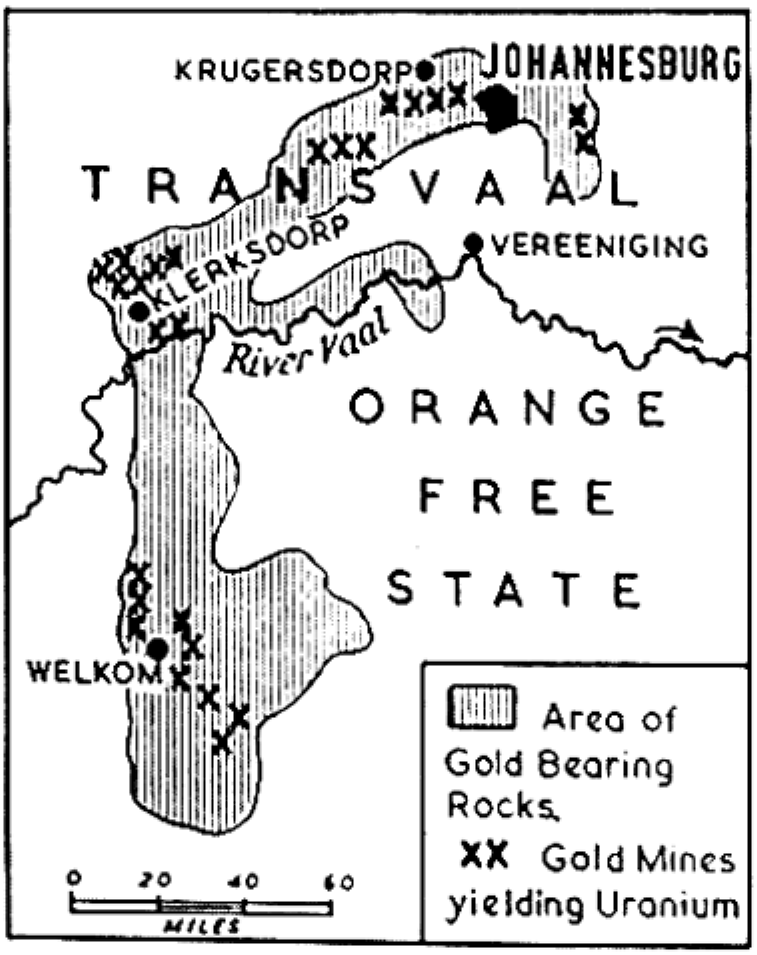


Fig. 30. South Africa: Gold Mines Yielding Uranium.

South Africa is the world's most important source of gem diamonds. Diamond cutting was not practised locally to any great extent before the 1939-45 war, but during the war Amsterdam, the famous diamond-cutting town in Holland, was cut off from South Africa and diamond cutting was started in Johannesburg, Cape Town, and Durban. Diamonds come second to gold in the mineral exports.

Coal mining has become increasingly important in recent years. The Transvaal mines, north-east of Johannesburg, produce most of South Africa's coal and supply the gold mines and the steel industry. The Orange Free State mines lie a few miles south of the Transvaal border and serve the gold- and diamond-mining industries. The best coal, however, comes from Newcastle in Natal. Natal supplies much of the coal for the ports, and for export.

Copper was mined in South Africa long before Europeans landed in the country. Modern mining, however, dates from the middle of the nineteenth century. The most important copper-mining areas are in Namaqualand—near Ookiep, and in the extreme north of the Transvaal—near Messina. Much of the copper is exported.

Important deposits of high-grade iron ore are worked in the west of the Transvaal, about 100 miles north of Rustenburg, in an area made accessible by the construction of a special railway. Large deposits of similar ore occur in Northern Cape Province but have not been developed. The Transvaal ore is used in the Transvaal steel industry. Chrome ores are found near Lydenburg and Rustenburg in the Transvaal, and in Northern Cape Province. These rich deposits have made South Africa one of the world's chief producers of chrome. Much of the ore is shipped overseas—especially to Japan—from Lourenço Marques, though increasing amounts are used in South Africa. Large modern factories, make chrome products. Chrome tanning salts are important for tanning leather.

Manganese production, chiefly from the districts west of Kimberley and Griqualand West, is increasing in importance.

Asbestos fibre is produced mainly in the Pietersburg and Lydenburg districts of northern Transvaal. South Africa ranks fourth among producers of asbestos with output in 1963 worth over R. 24 (£12) million.

Platinum production is increasing near Pretoria, Rustenburg, and Lydenburg. Other minerals of less importance are tungsten (near Upington), tin (Transvaal), mercury (Transvaal), and antimony (Transvaal).

## Manufacturing Industries

South Africa is the most industrialised country in Africa. Most of the industry is concentrated in four areas—Cape Town and Western Cape Province, Port Elizabeth, Durban, and the Southern Transvaal—the most important of all.

The oldest industries of South Africa are based on raw material from the farms—sugar refining at Durban, leather industries at Port Elizabeth, and fruit canning and wine making in Cape Province. Today, one of the largest industries is the steel plant at Pretoria fed from local supplies of coal, iron, and limestone. At Vereeniging, south of Johannesburg (see Fig. 31), there is a steel strip mill, and in several coalfield areas there are chemical plants which produce oil from bituminous coal, a valuable industry in a country which is unlikely to yield petroleum from its rocks. By-products from this oil industry are used to produce fertilisers, synthetic rubber, plastics, and detergents. There are also paint industries which make use of red iron oxide found in northern Natal, and yellow ochre from Cape Province. Boots and shoes are made at Port Elizabeth which produces one-third of the output. They are also manufactured at Johannesburg, Cape Town, Durban, and Pretoria. The development of this industry has led to parallel development in the tanning industry and a decline in the export of hides.

Textile industries are as yet little developed but Durban makes woollen blankets. Other industries include soap, cement, rubber tyres, cheese, and butter. However, despite the growth of South African industry in recent years, the chief imports are still manufactured goods.

### Chief Towns

*Johannesburg* (1,160,000) is the largest town in South Africa, and about one-third of the people are Europeans. When gold was discovered in the Rand in 1866, Johannesburg began to grow as a cluster of huts. Today it is a modern town with fine streets and buildings. The skyscrapers in its central business area and its active life give the impression of an American town. Around the main city lie the "black townships" where the African workers live.

Johannesburg is not only the centre of the Rand gold-mining industry, but it is also the centre of the chief manufacturing region. It is well placed on the main north-south railway and has rail links with the main South African ports and with the Portuguese port of Lourenço Marques.

Johannesburg is reached by air from London by regular B.O.A.C. services in about eighteen hours via Rome, Khartoum, and Nairobi.

*Pretoria* (424,000) lies 36 miles north of Johannesburg and is the administrative centre of South Africa. The town has many beautiful buildings and tree-lined thoroughfares; it has the air of an old Transvaal town—very different from Johannesburg. The Premier diamond mines, 25 miles away, first helped to make Pretoria important and nearby now lie the largest steel works in South Africa.

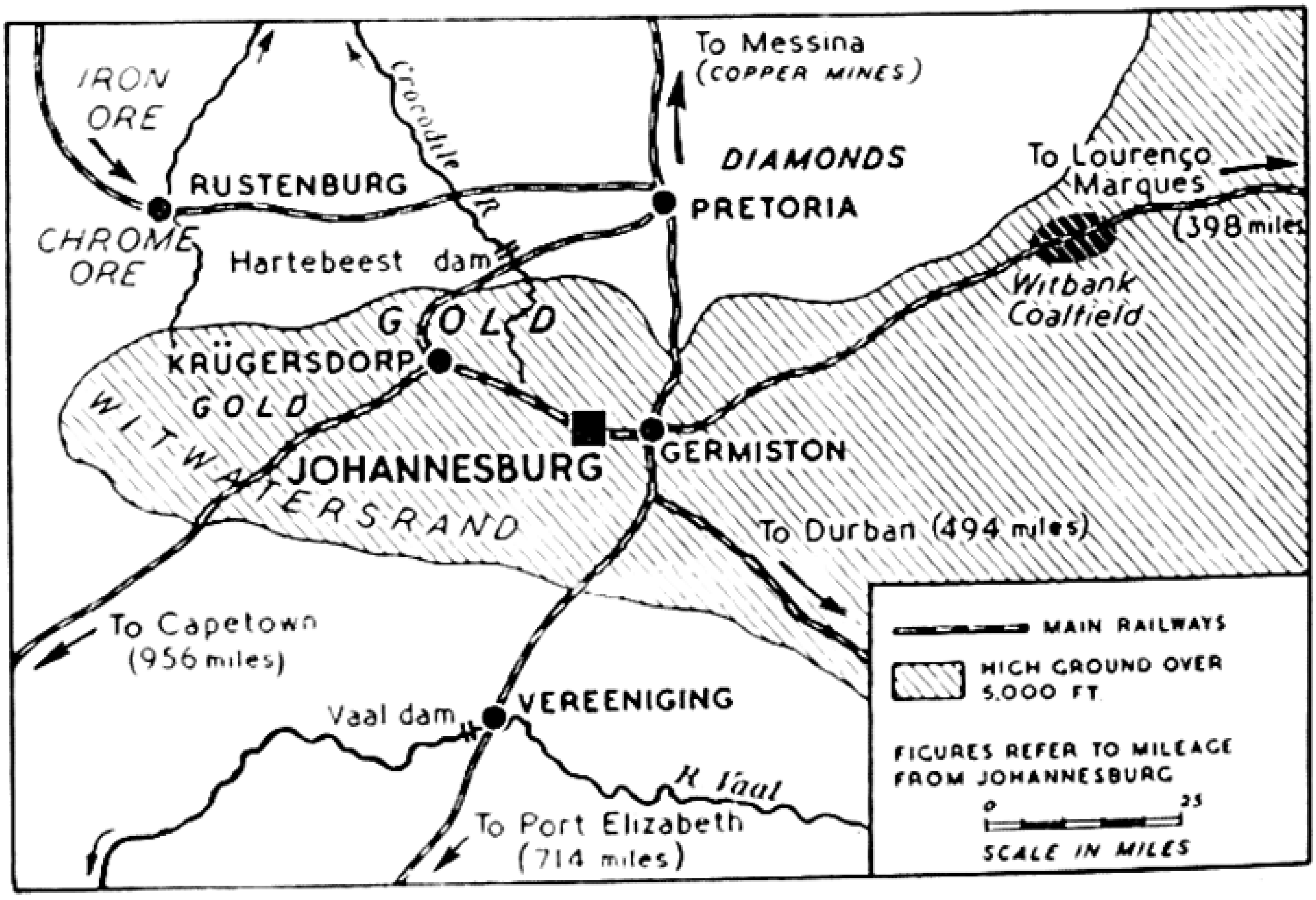


Fig. 31. THE POSITION OF JOHANNESBURG.

*Kimberley* (77,000), in Cape Province, became famous as a diamond-mining centre. Some of the early mines are closed but there remains the Big Hole where diamond mining began.

*Durban* (685,000), the main port and commercial centre of Natal, is the third city of South Africa with almost an equal number of Europeans, Africans, and Indians. It has an excellent harbour and serves the Transvaal as well as Natal which includes the important coalfield near Newcastle. The port is used by liners as well as cargo ships, and the lovely bay attracts many tourists. Durban has important industries and an oil refinery.

*Pietermaritzburg* (130,000), the capital of Natal, is 56 miles inland from Durban on the main rail route to Johannesburg. The town is the centre of the wattle industry.

*Cape Town* (810,000), founded in 1652, is the oldest and the second largest town of South Africa. Situated at the foot of Table Mountain, it has a very picturesque setting; behind it stretch fertile vine-clad valleys. The House of Assembly, where Parliament meets every January for a five-month session, is one of the town's many fine buildings. Cape Town is an important port with a harbour that has been improved by a breakwater to take modern shipping. Since the town lies on an ocean route from Europe to Australia and the Far East, many passenger and cargo vessels call there. Exports include fruit and wine. There is also a fishing industry.

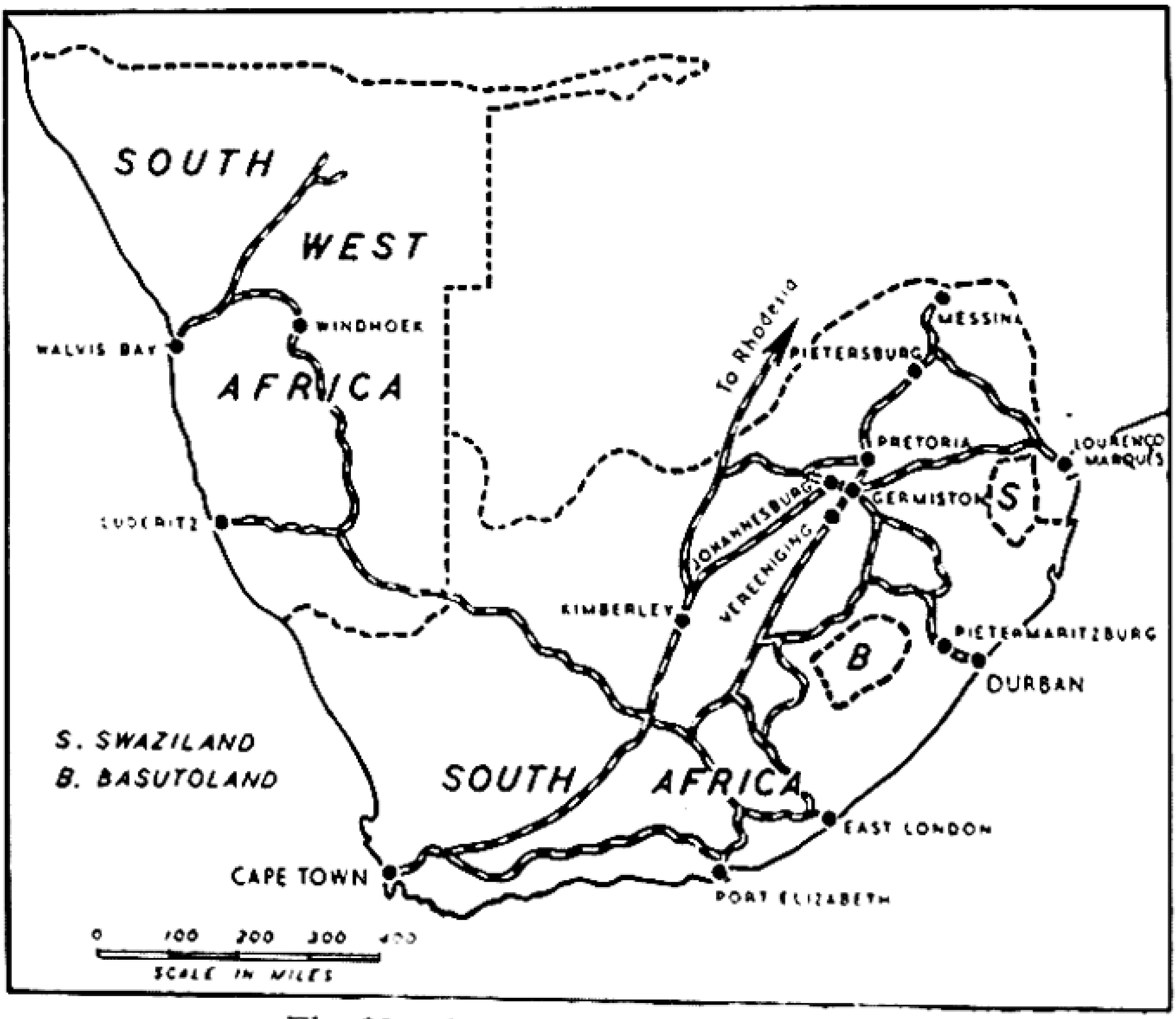


Fig. 32. SOUTH AFRICA: RAILWAYS.

*East London* (116,000) and *Port Elizabeth* combine port activities with tourist industries. The hinterlands are important for dairy-farming. Port Elizabeth makes rubber tyres, boots and shoes, and assembles cars from imported parts.

## Communications

The railway map (Fig. 32) shows that the eastern part of South Africa is well served by railways which connect all the more important towns and producing areas. Railways also connect South Africa with South-West Africa, Rhodesia, the Congolese Republic, and Mozambique.

Modern aircraft operate on regular routes within the Union, which is also served by airlines from Europe.

## Trade

In spite of expanding industries, South Africa is still mainly an exporter of raw materials and an importer of manufactured goods. Its trade figures (below) include those of South-West Africa.

The chief exports of South Africa for 1963 (excluding gold bullion) are given below in millions of Rand (2 Rand = £1 Sterling).

| | |
|---|---|
| Textiles | 127 |
| Wool | 115 |
| Fruit (fresh, dried, and preserved) | 93 |
| Maize | 93 |
| Base metals (lead, copper, manganese, asbestos, and chrome) | 44 |
| Chemicals | 42 |
| Fish and fish products | 34 |
| Hides and skins | 27 |

Other important exports include sugar, coal, bark extract, wines, and brandy. By far the largest buyer of South African produce is Great Britain. Considerable amounts also go to the U.S.A., Japan, Germany, and Italy.

The chief imports of South Africa for 1963 in millions of Rand were:—

| | |
|---|---|
| Machinery, vehicles, metals, and metal manufactures | 473 |
| Textiles, clothing, yarns, and fibres | 185 |
| Vegetable and fuel oils | 76 |
| Drugs, chemicals, and fertilisers | 57 |
| Books and Paper | 48 |
| Foodstuffs (including wheat, coffee, and tea) | 31 |
| Leather and rubber manufactures | 25 |

Great Britain supplies nearly one-third of the imports and the U.S.A., with roughly one-sixth, takes second place.

## SOUTH-WEST AFRICA

South-West Africa, once a German colony, became a mandated territory under the League of Nations after the First World War. The United Nations claims to have inherited that jurisdiction but the South African Government has virtually incorporated South-West Africa as a fifth province of the Republic and has applied its "separate development" policy (see p. 123).

South-West Africa stretches from the Orange River in the south to the border of Angola in the north, a distance of about 800 miles. It is almost entirely part of the South African plateau. The central part is hilly country which lies between the dry Namib Desert on the west and the semi-desert of the Kalahari on the east. The Namib Desert is sandy and flanks the coast extending from 50 to 90 miles inland.

Characteristic features of the northern and eastern parts of the country are shallow depressions with no outlet to the sea. Some contain brackish water, others are salt pans covered in the dry seasons with a dazzling white crust of salt. The Etosha pan, a very large depression in the north is covered with shallow water in the wet season.

South-West Africa is mainly a semi-arid region. The rainfall is greatest in the north, where it reaches 20 in. a year, and here the vegetation is savanna. The central uplands are mostly grasslands which merge into poor scrub in the south and east. The territory is subject to periods of drought.

The inhabited part of South-West Africa lies mainly between the Namib and Kalahari Deserts. The population is sparse: there are about 73,000 Europeans, 460,000 Africans including Hottentots and Bushmen, and a few coloured people. Roughly two-thirds of the Europeans have settled in the territory since it came under the administration of South Africa. The remaining third are Germans. The Africans are mainly sheep and cattle rearers. Those in the north have inhabited the region for many years and preserve their tribal customs. They not only keep cattle, but grow good crops of grain and make weapons of copper and iron which they smelt from the ore. Nearly half the Africans belong to the Orambo tribe which inhabits the north, bordering Angola. The dominating though smaller tribe is the Herero who live by stock rearing in the centre and south—the region where most of the whites live. They are bitterly resentful of white settlement in South-West Africa.

The Bushmen who live in the southern arid areas are completely untouched by European influences. Clad in a strip of antelope hide, they roam over the country, hunting with bows and poisoned arrows, collecting wild foods, and camping in temporary huts made of grass and branches.

### Occupations and Products

South-West Africa is mainly a pastoral country. Most of the native Africans rear cattle. Ranching and dairy farming are carried on by the European settlers. Live cattle, beef, and dairy produce are sold mainly in South Africa.

In the south, where the rainfall is low, many sheep are bred. The chief animal of economic importance is the desert sheep known as the karakul, of which there are over two million. These sheep were originally introduced by the Germans from Central Asia in 1909. Newly born lambs which have fine black curly coats are killed for their pelts which are known as Astrakhan or Persian lamb. These are in great demand in the U.S.A. where they are made into expensive coats.

Fishing is carried on off the coast of South-West Africa and there are fish processing factories at Walvis Bay, Lüderitz Bay, and elsewhere, which deal with snoek, pilchards, and crayfish.

Diamonds are obtained from gravels below deep sand along the coast between Walvis Bay and the mouth of the Orange River, and are also recovered from beneath the sea by suction hose south of Lüderitz. They are by far the most valuable export and South Africa is now the world's largest producer of diamonds. Other minerals include copper, lead, zinc, tin, manganese, and vanadium. Guano deposits are worked along some parts of the dry coast.

### Towns and Trade

*Windhoek* (36,000) is the administrative capital—situated in the heart of the ranching country. It has three prosperous white communities—Afrikaner, German, and English and it lies on the main railway line from the Republic. It also has rail connections with the ports of *Walvis Bay* (900 whites) and *Lüderitz* (1,100 whites).

The chief exports in order of value are diamonds, lead ore, and karakul pelts. Butter, tinned fish, wool, and hides are also exported.

The chief imports are metal goods, textiles, foodstuffs, and oils. Most of the trade is with South Africa.

## THE HIGH COMMISSION TERRITORIES

There are three countries in southern Africa—Bechuana, Swaziland, and Lesotho (formerly Basutoland), known as the High Commission Territories. They were previously British Protectorates.

### Bechuana

Bechuana covers an area roughly three times as large as Great Britain and Northern Ireland. It is a land of contrasts. In the south lies the arid Kalahari Desert with vast areas of barren rock and sand dunes, clothed in places with coarse grass and bush. Towards the centre of the country the desert gives place to scrub, grass, and woodland. In the north, the River Okavange flows from the high veld of Angola (to the north-west) into a depression in the plateau (part of the Makarikari Basin—see Fig. 1), through a delta region as extensive as the delta of the Nile, to form an enormous marsh. Much of this northern area, which is sometimes known as Ngamaland, is covered with dense, tropical vegetation.

Bechuana, which is self-governing, is sparsely peopled with about 540,000 Africans who live in tribal communities in the more fertile areas. But the average density of population is low. The chief occupation is the raising of cattle. A little maize is grown but in most parts the soil is too poor and the rainfall too scanty for good crops. Some maize is imported in years when the crops are poor. A number of Africans go to work as migrant labourers in South Africa.

Bechuana is a poor country because over much of its surface water is scarce. A careful survey has shown that the Kalahari region is desert because it lacks *surface* water but, below the surface, water is stored in the rocks in considerable quantities. Bore holes have now been sunk in a number of places and yield adequate supplies for watering cattle. A large ranch has been established at Molepolele in the south; beef and live cattle are exported to South Africa and Zambia. Chilled carcases are even sent to Europe.

A second large ranch is growing in the north of the country and cereals are being cultivated on the borders of Southern Rhodesia, partly on land leased from the Government of Southern Rhodesia. In time this should go far to make the country self-supporting in cereals.

Looking to the more distant future it is estimated that a dam across the Okavange River to control its waters could bring large parts of Ngamaland into cultivation to provide such crops as rice, sugar, groundnuts, and cotton, as well as pasture land for cattle.

Asbestos, mined near Kanye, is the most valuable mineral. Manganese is mined and coal, copper, silver, and gold are known to exist but so far they have been little worked. The towns of Bechuana lie in the east of the country on or near the main railway between South Africa and Rhodesia. In the south lies *Lobatsi* which has a meat canning plant. *Gabarones*, the capital, lies a little further north. *Serowie* is thirty miles west of the railway with modern buildings, including a hospital, set among the circular thatched huts in which most Africans live.

*Francistown*, still further north, is the main trading centre with an airport.

### Swaziland

Swaziland lies on the edge of the plateau with Transvaal on the west, and Natal and Mozambique on the east.

This is the smallest and most prosperous of the British territories in South Africa. The authority of the British Government is delegated to a Resident Commissioner with headquarters at *Mbabane*. He is responsible for the administration of a territory with about 280,000 people, though there are plans to give the native Africans (mainly Bantus) more responsibility. There are about 10,000 Europeans and a few Indian traders. The African people belong to a single Swazi tribe under a Paramount Chief. Racial discrimination is a punishable offence in Swaziland.

The west of Swaziland is well over 4,000 ft, but to the east the land is lower and more fertile and an abundant rainfall results in good grazing land for cattle and sheep. The white people, mainly South Africans, own nearly half the land. They run cattle and sheep ranches, and sugar estates. In winter sheep are even brought in from the Transvaal. The Africans are mainly peasants who keep cattle and grow food crops, especially maize, millet, and groundnuts, but rice, cotton, sugar, tobacco, pineapples, and citrus fruits are grown in some places. Many Africans go for periods as labourers to the gold mines of the Witwatersrand and to other industrial work in order to earn money.

The Commonwealth Development Corporation has planted forests and has irrigated land which is now farmed by Swazis. Their habits are slowly changing as a result of these schemes and the spread of new ideas. Their diet now includes vegetables, they are taking steps to combat soil erosion by terracing their hill fields, and are co-operating to sell the milk from their dairy cattle.

The Havelock asbestos mine in the north-west of Swaziland has for many years been the chief source of wealth. High grade iron ore is obtained in the same area at Ngwenga and is increasing in importance. Much of the ore is taken by railway to the Mozambique port of Lourenço Marques for export to Japan. The railway provides an outlet for wood pulp, sugar, and citrus fruits.

**Lesotho**

Lesotho, formerly Basutoland, is a small and very mountainous country enclosed between Natal, the Orange Free

State, and Cape Province. The Drakensberg occupy most of the region which is cut by deep valleys and watered by heavy rains from which the rivers flow into the Republic of South Africa.

The Africans number about 880,000 and have been granted self-government. The population is too large for so small and mountainous a country—and much of the better grazing land has been overstocked. As a result, soil erosion has ruined large tracts. Cattle, sheep, and goats thrive where the pastures are still good, and hardy ponies and horses are bred. Maize is the chief food crop. Strict measures are needed to conserve the soil and improve crops. As the land is owned by the African tribes, every change must be approved by the local chiefs. Education is, however, spreading and most Lesotho parents are keen for their children to learn to read and write. One child in six goes to school, but many boys are not able to leave their cattle herding duties. Lesotho is unable to support its population. At any one time at least 180,000 are working away from home in the mines and on the farms of South Africa.

New industries are now being established to make paint, clothing, furniture, and cigarettes. These will help to provide local employment.

*Maseru*, the capital, lies on the lowlands near the eastern frontier where most people live. It is linked by rail with the South African network and is approached by road from Bloemfontein in the Orange Free State.

Exports from Lesotho include wool, mohair, wheat, peas, and beans. Imports are ploughs, clothing, and hardware. Trade is mainly with South Africa.

# CHAPTER IX

## SOUTH AMERICA: DISCOVERY AND PEOPLES

South America, Central America, Mexico, and part of the West Indies, are known as Latin America because they were discovered and colonised mainly by "Latin" races from Southern Europe—the Spanish and Portuguese.

### The Native Indians

When the first Europeans came to South America, the land was inhabited by tribes of Indians who, like the Red Indians of North America, belonged to the Mongolian race. These Indians had a brownish skin and dark, straight hair, though they varied greatly from tribe to tribe. Over much of the eastern part of the continent the conquerors found uncivilised and primitive Indian tribes which lived by hunting and fishing. Other tribes, living on the grassy plains, were warlike and resisted the invaders, but it proved to be an unequal struggle and these tribes were either driven into the less accessible forests, or were practically exterminated. Many primitive Indian tribes still inhabit clearings in the equatorial forests of the Amazon but they play no significant part in the economic life of the country.

On the mountain plateaux of the Andes and on the dry plains along the Pacific coast the Spaniards found Indians who had reached a high degree of civilisation. These Indians, of which the Quechua and Aymara were two powerful tribes, belonged to the Inca Empire—the word *Inca* meaning king, or lord. The origin of the Empire is shrouded in legend.

The Inca Empire was probably founded in the twelfth century, about 400 years before the coming of the Spaniards, but the date is uncertain. When the Spaniards arrived in the early sixteenth century they found a highly organised community governed by an Inca whose Empire covered the greater part of Ecuador, Peru, and Chile—as we know those countries today (see Fig. 33). There were two strata of society, the Inca and his relatives, who formed the nobility, and the workers. For the purpose of government and social service, the whole community of workers was divided into small groups and in each group one member looked after the interests of the others and was responsible to the Government

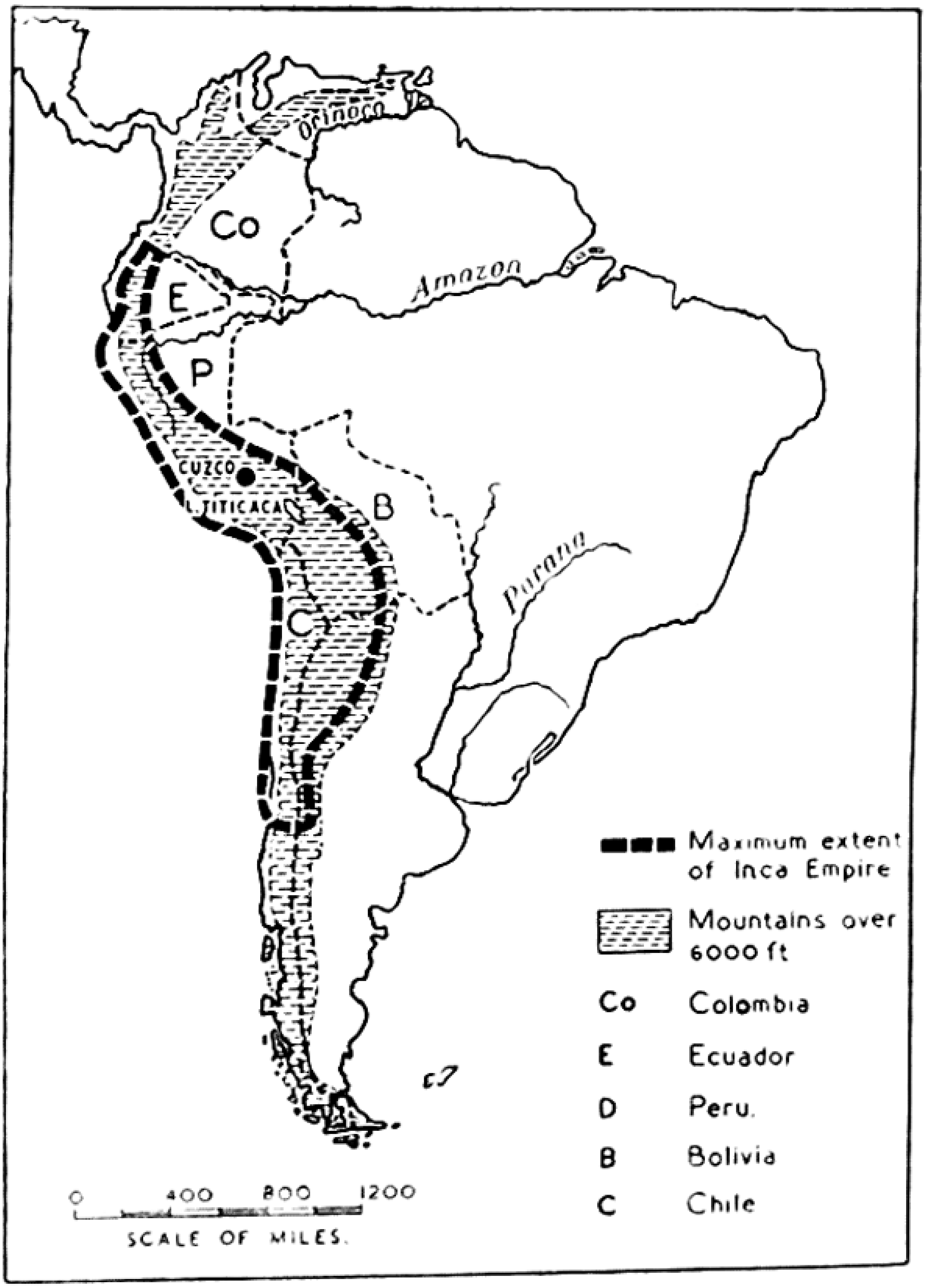


Fig. 33. Map showing the extent of the Inca Empire in Relation to the Andes Mountains and the Modern Andean States.

for their welfare and conduct. All labour was organised and idleness, except among the sick, was not tolerated. Money was unknown; payment for services to the Inca and to the State was made in kind. Land, food, and clothing were given to the people by the Inca according to the need of each individual family. A high standard was reached in many arts and crafts, even without the knowledge of iron tools.

Agriculture was an important occupation. Remains of terracing on the hillsides and of tunnels and conduits for bringing water to the fields are still to be seen. In a mountainous country the type of crop varies with altitude. At lower altitudes maize was grown; in the higher parts hardy grains and potatoes thrived. Pastoral farming was common on the plateau. Herds of wild llama, vicuna, and alpaca, fed on the grassy slopes and some, which were domesticated, provided fine wool for spinning and weaving. Spinning and weaving was done by the women and some of the cloths used by the Incas and the nobility were of fine quality and were dyed in brilliant colours.

Houses were usually built of stone and large bricks, and were roofed with thatch. They seldom had more than one storey and had no windows. The houses of the workers were small and mean, but the Inca owned large and imposing palaces and fortresses, and they worshipped in wonderful temples. Sometimes cement was used in their buildings but the masons often relied solely on careful cutting to make the blocks of stone fit together with great precision. Since iron was unknown to the Incas, tools of stone, copper, and copper-tin alloys, were used for this work and also for making paved roads and building bridges. Mining produced gold, silver, copper, and emeralds; these were all used for decorating the temples and palaces and even for making household utensils. Since there was no use for money, gold and silver were valued solely for their beauty. It was little wonder that the existence of so much gold excited the avarice of the early Spanish conquerors.

## The Spanish Conquerors

After the discovery of the West Indies in 1492, Spanish captains and adventurers penetrated inland around the Caribbean Sea in search of gold. In the early part of the sixteenth century, many bands of men crossed the Isthmus of Panama and then sailed southwards. Some perished on the arid coast; others penetrated into the heart of the Inca

Empire. At first the Indians were friendly and even welcomed the Spaniards but it was soon evident that the acquisition of gold, silver, and precious stones, was the chief aim of the invaders. Palaces and temples were stripped of their treasures; indeed, so much precious metal was obtained that some of it was melted down to make it easier to take back to Spain. The comparatively few undamaged objects to reach Spain showed the high standard of Inca art. Fighting eventually broke out between the Spaniards and the Incas who were finally overthrown and their Empire destroyed. The descendants of the Incas who live in the western plateaux today show little of the proud bearing of their ancestors. They are mostly poor, illiterate, peasant people who play little or no part in the Government and development of their country.

### The Portuguese Conquerors

The east coast of South America was discovered by a Portuguese ship which had been blown out of its course by the Easterly Trade Winds when making a voyage to South Africa in the year 1500. The Portuguese found no gold or silver to attract them, but they soon realised the possibility of wealth from the growing of sugar-cane on the hot, wet coastal plains in this part of South America—which we now call Brazil. Sugar was in great demand by rich merchants in Portugal at this time and fetched a high price.

The problem of finding labour for the sugar plantations soon became acute. The Portuguese colonists thought manual work degrading and expeditions were sent inland to obtain native slaves, but these proved unsatisfactory. The problem was finally solved by importing negro slaves in large numbers from Africa.

### ✓ The Colonial Period (roughly 1520-1820)

Brazil was colonised by the Portuguese while the rest of South America, except for the Guianas, became Spanish. The Governors of the colonies were usually wealthy men who held their appointments directly under the home Governments. Their homes were in Europe and, together with their followers and relations, they formed the highest layer of colonial society. The next layer was made up of pure-blooded

Spaniards and Portuguese born in South America who were mainly landowners and merchants. There were also large numbers of priests who ministered to the colonists and converted many Indians to Roman Catholicism. The early colonists were mostly men, and many of them had Indian wives. Thus, there has grown up a considerable half-breed population with varying proportions of white and Indian blood. These people are known as mestizos.

During the colonial period, Spain was chiefly interested in the acquisition of gold and silver from her South American possessions, while Portugal was more interested in tropical plantation products, although gold and diamonds were discovered in Brazil between 1693 and 1729. In general, the South American colonies were run for the benefit of the home countries who monopolised their trade and discouraged local industries. The colonists had no power to govern or direct the affairs of their territories. Eventually this led to unrest and to rebellions against Spanish and Portuguese rule. In the early nineteenth century the colonies, one by one, broke away and became Independent Republics.

After this, for over a century, these South American Republics suffered from unstable Government. Trade with Spain and Portugal had virtually ceased. Remoteness from the main ocean trade routes, lack of internal communications, and the continuous threat of internal revolution held up progress until the end of the nineteenth century. Since then there has been a steady development of natural resources, transport, and trade, so that foreign immigrants and foreign capital have been attracted to these countries, though from time to time rebellion breaks out in some of these Republics where Government is still unstable.

## The Population of South America

South America is more than twice as large as Europe but its population of about 230 million is less than one-third of the population of Europe. In 1900, the population was only sixty million. The rapid increase continues but the distribution is very uneven: most people live near the coast, in big cities, or on the mountain plateaux in the tropics. Large tracts of the interior, such as the Amazon forests, the higher and steeper mountain slopes, and the arid districts of the west and south, are virtually uninhabited.

THE INDIANS TODAY. Tribes of native Indians form the lowest stratum of society in many South American countries. Many tribes in the Amazon forests still have an independent existence occupied in hunting, fishing, and gathering wild food. Others—the descendants of the Incas, for example—have become resigned to a semi-servile existence, working in mines and on agricultural estates, or looking after their own small plots of land. The warlike Indians, who once inhabited the Pampas, have been largely exterminated in the unequal struggle against white invaders. Illiteracy is high among the Indians and few have assimilated the culture of their conquerors. The influence of the Indians is perhaps best seen in the large number of mestizos; they form the middle and working classes in many Republics. Nine-tenths of the people of Bolivia, Peru, Ecuador, Colombia, Venezuela, and Paraguay are Indians or mestizos, while nine-tenths of the people of Argentina and Uruguay are white. The proportion of Indian and mestizo blood in the Republics has an important effect on their outlook and development, as will be seen later.

NEGROES. The descendants of the negro slaves (p. 152) form another racial group, largely confined to the lowest grades of manual workers. They live almost entirely in the tropical coastal plains of South America. Negroes and mulattoes, or half-breeds with negro blood, form nearly one-fifth of the population of Brazil. Although, in theory, there is no race discrimination against negroes, most of them are illiterate and among the poorest section of the population; only a few with negro blood have risen to occupy important positions. In the Guianas some of the negroes have taken to a semi-savage life in the forest, and the difficulty of bringing these bush-negroes back into the life of the community is a very real one.

IMMIGRANTS TO SOUTH AMERICA. Many Spaniards and Portuguese settled in South America during the colonial period (p. 152). In nine South American Republics the official language is Spanish, while in Brazil the official language is Portuguese. Pure-blooded descendants of these early colonists form the aristocracy of most of the Republics. During the nineteenth and early part of the present century many immigrants came from southern Europe, particularly Italy, to work

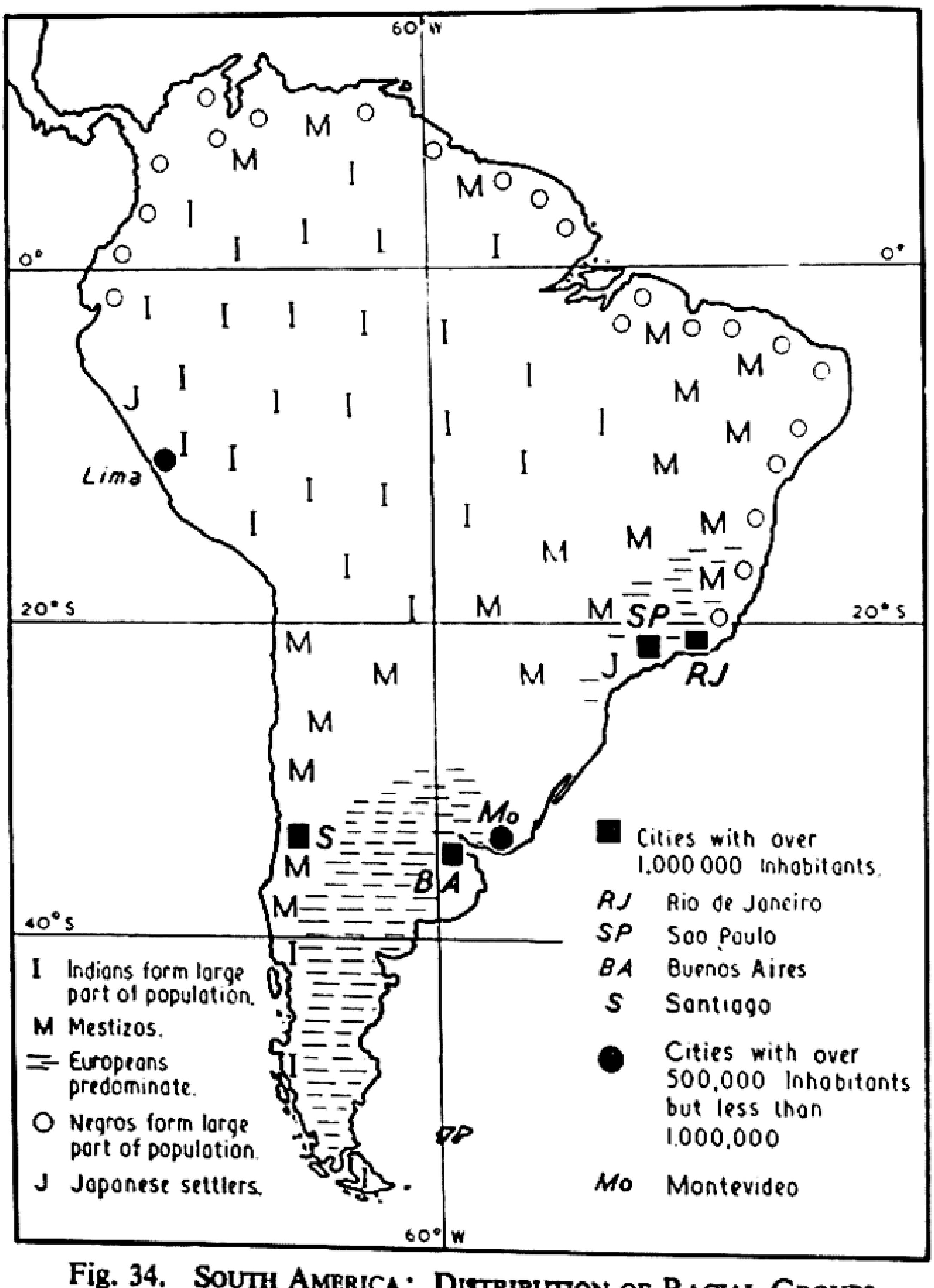

60° W
0°
20° S
40° S
Lima
SP
RJ
Mo
S
BA
I Indians form large part of population.
M Mestizos.
Europeans predominate.
O Negros form large part of population.
J Japanese settlers.
■ Cities with over 1,000 000 inhabitants.
RJ Rio de Janeiro
SP Sao Paulo
BA Buenos Aires
S Santiago
● Cities with over 500,000 Inhabitants but less than 1,000,000
Mo Montevideo

Fig. 34. South America: Distribution of Racial Groups.

in the agricultural districts of Argentina, Uruguay, and southern Brazil. These people came mainly from the peasant classes and were used to manual work. Other immigrants came from Germany and by the time the First World War broke out in 1914 they had already established prosperous farms in southern Brazil. British settlers are few; there are some Scottish and Welsh sheep farmers in Patagonia, and a few British businessmen, and engineers are to be found in the larger towns of South America.

Japanese settlers are to be found in the Sao Paulo coffee district of Brazil, and there are both Chinese and Japanese on the coastal plain of Peru. On the plantations of Trinidad and the Guianas much of the manual work is done by immigrants from South-East Asia. Technical experts from Japan, France, and Germany help in the development of the motor car and other industries in large industrial centres such as Sao Paulo in Brazil. A summary of the main elements in the population of South America is given in Fig. 34.

There are great extremes of poverty and wealth in South American countries. The large industrial and commercial cities such as Rio de Janeiro are well built and prosperous but around them there are often squalid villages and shanty towns where the workers live who have come to the urban centres to find employment (see plate opposite p. 229). Two thirds of the land in South America is owned by 2 per cent. of the wealthy "farmers" in large estates of 1,000 acres or more. The majority who are working farmers own less than 4 per cent. of the farm land, in tiny holdings.

# CHAPTER X

## SOUTH AMERICA: PHYSICAL CONDITIONS

### Relief and Drainage

South America may be divided into three main relief divisions each stretching from north to south (Fig. 35, p. 158).

(1) The Cordilleras of the Andes.

(2) The Central Lowlands.

(3) The Eastern Highlands consisting of the Guiana Highlands and the Brazilian Highlands.

A simplified section across South America from west to east at approximately latitude 20° S. (Fig. 36, p. 159) shows the relation between these three divisions.

(1) THE ANDES. The Andes form an unbroken stretch of high mountain country which flanks the Pacific coast from the Caribbean Sea to Cape Horn. Except in the extreme south, the Uspallata Pass, linking Argentina with Middle Chile, is the only break in this formidable barrier. In comparatively late geological time, the Andes were folded into a complex system of ranges and intermontane plateaux and basins. Majestic volcanic cones, many still active, rise to over 20,000 ft in height. In general, the Andes consist of two main ranges which form the western and eastern sides of the mountain system. Off the west coast are ocean abysses more than 20,000 ft deep. From these, the sea floor slopes steeply up, in some places to a narrow coastal plain, in others to low coastal hills behind which stretches a longitudinal valley. To the east of this coastal tract, the main western range rises abruptly to great heights. The Eastern Andes are equally high but they are less forbidding than the Western Andes because they are cut by many river gorges and their eastern slopes are broken by fertile valleys. North of latitude 25° S., the two ranges enclose high intermontane basins and plateaux such as the altiplano of Bolivia and Peru. In places the western and eastern ranges converge to form complicated mountain knots, thus cutting the plateau into

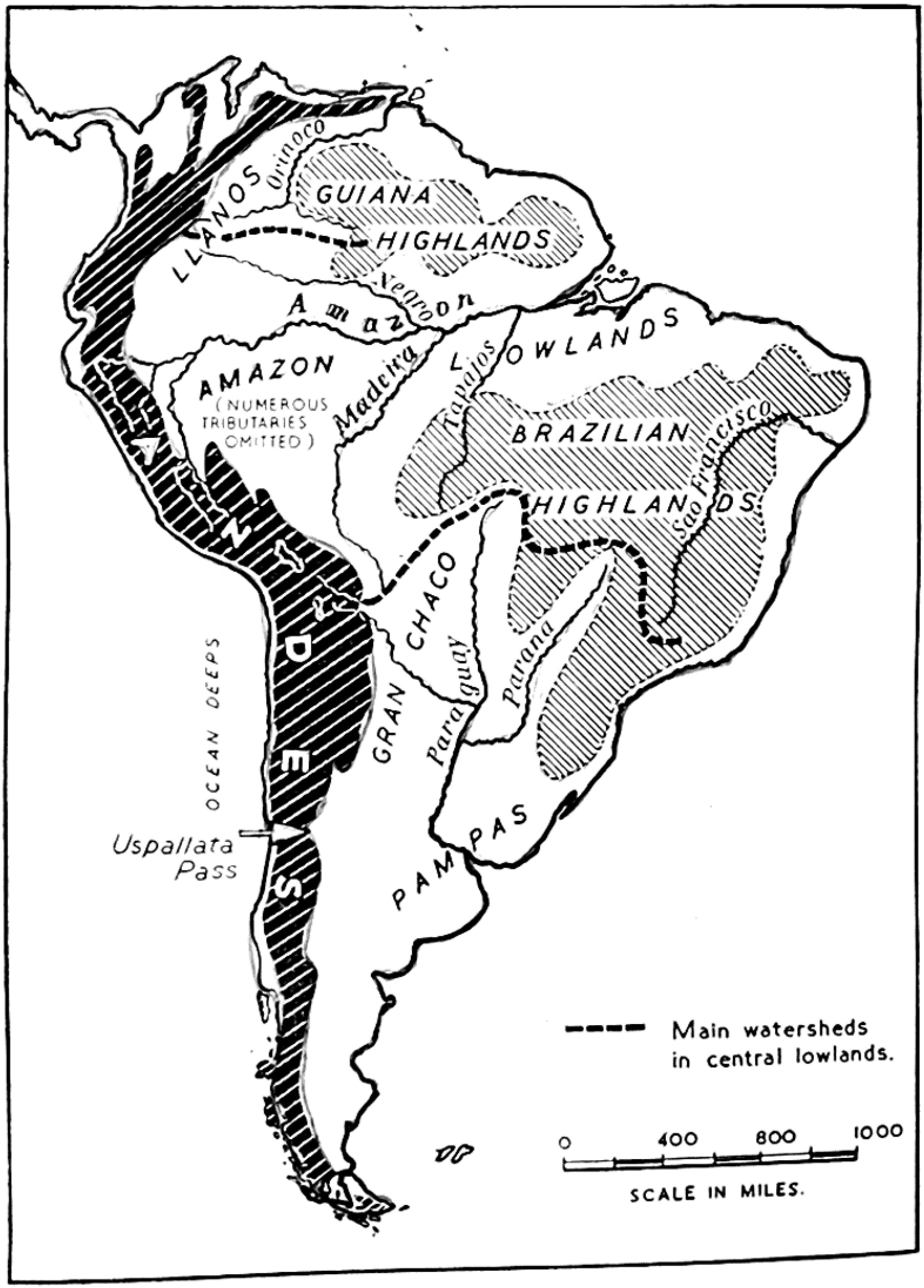


Fig. 35. South America—Relief.

mountain-girt basins of interior drainage. In one such basin lies the large freshwater lake of Titicaca, with surface 12,508 ft above sea level. Although the plateaux vary in height, the average is about 10,000 ft above sea level, and except for Tibet, they are the highest inhabited plateaux in the world. This part of the Andes is rich in minerals.

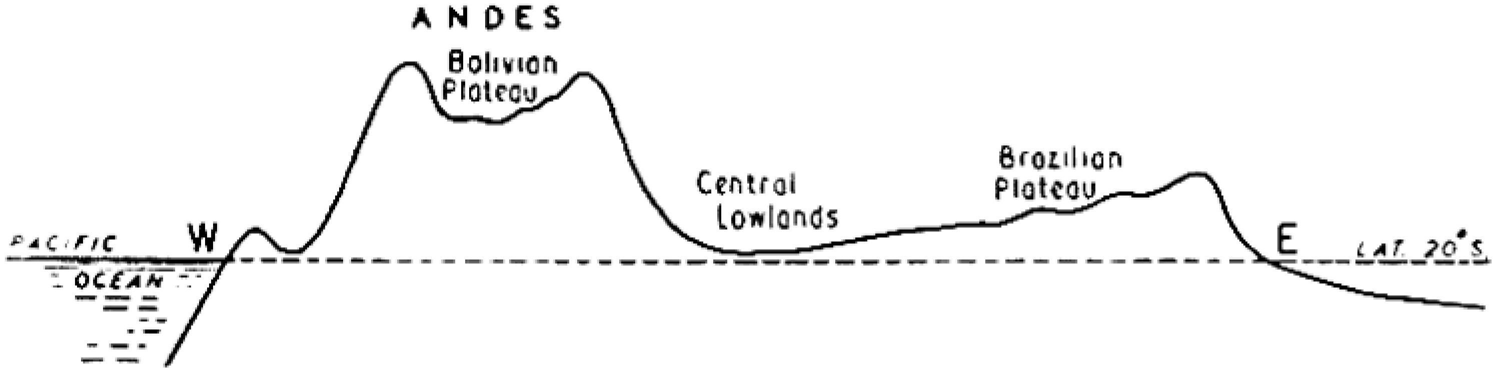
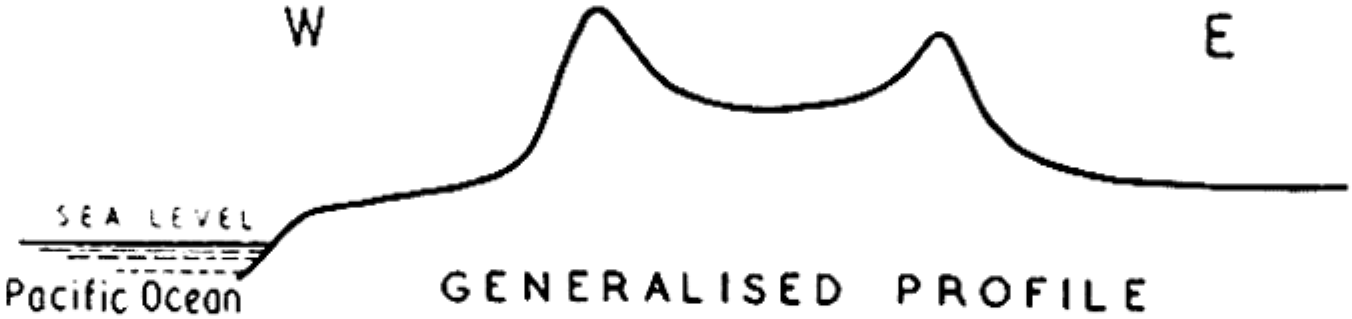


Fig. 36. Diagrammatic Section across South America along Latitude 20° S.



| Country | Coastal Plain | WESTERN ANDES | Plateau | EASTERN ANDES | Interior Lowland |
|---|---|---|---|---|---|
| Colombia 441,000 sq. miles | Caribbean and Pacific Coastal Plains | | Plateau dissected by rivers Cauca and Magdalena | | Orinoco Basin<br>Amazon Basin |
| Ecuador | Pacific Coastal Plain | | Plateau and Mountain Knots | | Amazon Basin |
| Peru | Pacific Coastal Plain | | Large area of Plateau.<br>Centre of old Inca Empire | | Amazon Basin |
| Bolivia | No Coast or Coastal Plain | | Large area of Plateau | | Amazon Basin<br>Plate River Basin |

Fig. 37. The Andes Mountains north of Latitude 25° S.

Further north, in Colombia, the Andes are cut by the valleys of northward-flowing rivers, the Cauca and Magdalena, which divide the Andes into three ranges—western, central, and eastern. The Western Cordilleras stretch towards the Isthmus of Panama, the Central Cordilleras trend north-north-east to the western shore of Lake Maracaibo, and the eastern Cordilleras swing round to the north-east and, as the Caracas Highlands, flank the north coast of Venezuela.

South of latitude 20° S. there are no extensive intermontane plateaux. The Eastern and Western Andes merge into one range which becomes lower and less of a barrier towards the south where the land has undergone submergence. This is shown by the fiord coast and the numerous rocky islands. At one time extensive glaciers covered the Southern Andes and this has resulted in beautiful lake and mountain scenery, particularly on the eastern side. In the extreme south glaciers still descend from the mountains and, in some places, reach the sea at the heads of the fiords.

The western slopes of the Andes give rise to only short streams but numerous large rivers drain the eastern slopes, many flowing to the Amazon.

The Pacific side of the Andes is unstable and subject to earthquakes.

(2) THE CENTRAL LOWLANDS. These occupy about one-half of South America. They consist of three main areas—the llanos of the Orinoco Basin; the Amazon Basin; and the Paraguay or Plate River Basin. Although highlands partially surround these lowlands, it is possible to pass from the llanos to the Plate estuary without rising 1,000 ft above sea level. The uniform level of the lowlands is partly due to the fact that they are composed of undisturbed marine sediments of recent geological age, capped by alluvial deposits brought down by numerous rivers or, in the drier areas of the pampas, by wind-blown material.

Three important river systems drain the lowlands to the Atlantic Ocean. In the north the Orinoco and its tributaries drain the llanos. The Guiana Highlands divide the Orinoco Basin from the Amazon Basin in the east but to the west the watershed is very low and is actually crossed by the Cassiquiare, a stream which sometimes flows to the Orinoco and sometimes to the Negro, a tributary of the Amazon. Gigantic rivers such as the Marañon, Negro, Madeira, and Tapajoz flow into the Amazon to form the largest river system in the world. Although waterfalls occur in the upper reaches of some of the tributaries, the lower courses, unlike African rivers, have a remarkably low gradient. In the last 2,000 miles of its course, the Amazon drops only 350 ft. Ocean-going vessels can ascend the river for 2,300 miles to Iquitos in Peru, while many of the tributaries are navigable to smaller craft for 500 to 1,000 miles. Thus, unlike the Congo, the Amazon affords a great waterway from the ocean to the interior.

A low watershed divides the rivers which flow to the Amazon from the headwaters of the River Paraguay which flows south to the Plate estuary. The Paraguay is joined by the Parana which rises in the Brazilian Plateau. These rivers, together with the Uruguay, form the Plate River system. Although the Plate estuary needs continual dredging to afford passage for boats, it is possible to go by river steamer as far as Concepcion, a distance of about 1,100 miles. These rivers form an outlet to the sea from the inland country of Paraguay.

(3) THE EASTERN HIGHLANDS. These are much lower than the Andes. They form two highly dissected hilly areas—the Guiana Highlands to the north of the Amazon, and the Brazilian Highlands to the south. They are considerably older than the Andes and are formed of ancient igneous rocks, sandstones, and more recent lava flows. The surface is broken up into flat plateaux and rounded hills with occasional extinct, volcanic cones rising above the general level. The highest part of the Brazilian Highlands lies very near the east coast of Brazil where it reaches nearly 10,000 ft in height. Between latitude 20° S. and latitude 30° S., the highlands rise abruptly from the coast and form a barrier to communication with inland areas. Further north, there is a wider coastal plain. Except for the Sao Francisco, only short streams drain the Atlantic slopes. Most rivers flow inland to the Parana. The Brazilian Highlands, which are of similar geological age to the African Plateau, also resemble it in being rich in minerals.

## ✓ The Climates of South America

South America narrows towards the south and therefore, it does not experience, in temperate latitudes, a large annual range of temperature, as the northern continents do in similar latitudes. It is widest near the Equator where there are more extensive areas with a typical equatorial climate than in Africa. South America also has vast mountain ranges and plateaux which give it large areas with climates of temperate, and even arctic, type within the tropics. Indeed, the Andes not only modify the climate because of their altitude but they also form a climatic barrier between the Pacific Coast and the lands which lie on the eastern side.

TEMPERATURE CONDITIONS. On the whole the region of South America that lies between the tropics has lower temperatures than those experienced in the corresponding parts of Africa and Australia. This is partly due to greater cloudiness in this part of South America.

In January, when the sun is overhead south of the Equator, the hottest areas are in south Brazil and northern Argentina where the average temperature is over 27° C. (*80° F.*). In this season the extreme south of the continent has an average temperature of about 10° C. (*50° F.*).

In July, only the extreme north of the continent is over 27° C. (*80° F.*). South of the Equator, July is the winter season, but there are no very low temperatures except on the mountains. The 0° C. (*32° F.*) isotherm passes south of Tierra del Fuego, roughly 55° S. This contrasts sharply with North America where the 0° C. (*32° F.*) isotherm curves southwards to about 35° N. in the Mississippi Basin. The difference is largely due to the fact that South America is much narrower than North America in temperate latitudes.

The chief ocean currents affecting the climate of South America are shown on the map (Fig. 38). It will be seen that north of latitude 40° S. the Pacific Coast is affected by the cool Peruvian or Humboldt Current. Since the prevailing winds are off shore, there is also an upwelling of cold oceanic waters along this coast. The warm Brazilian Current, however, passes southwards along the east coast of Brazil. As a result, places on the east coast have higher average annual temperatures than places of similar latitude on the west coast. Thus, while Iquique (latitude 20° S.) has

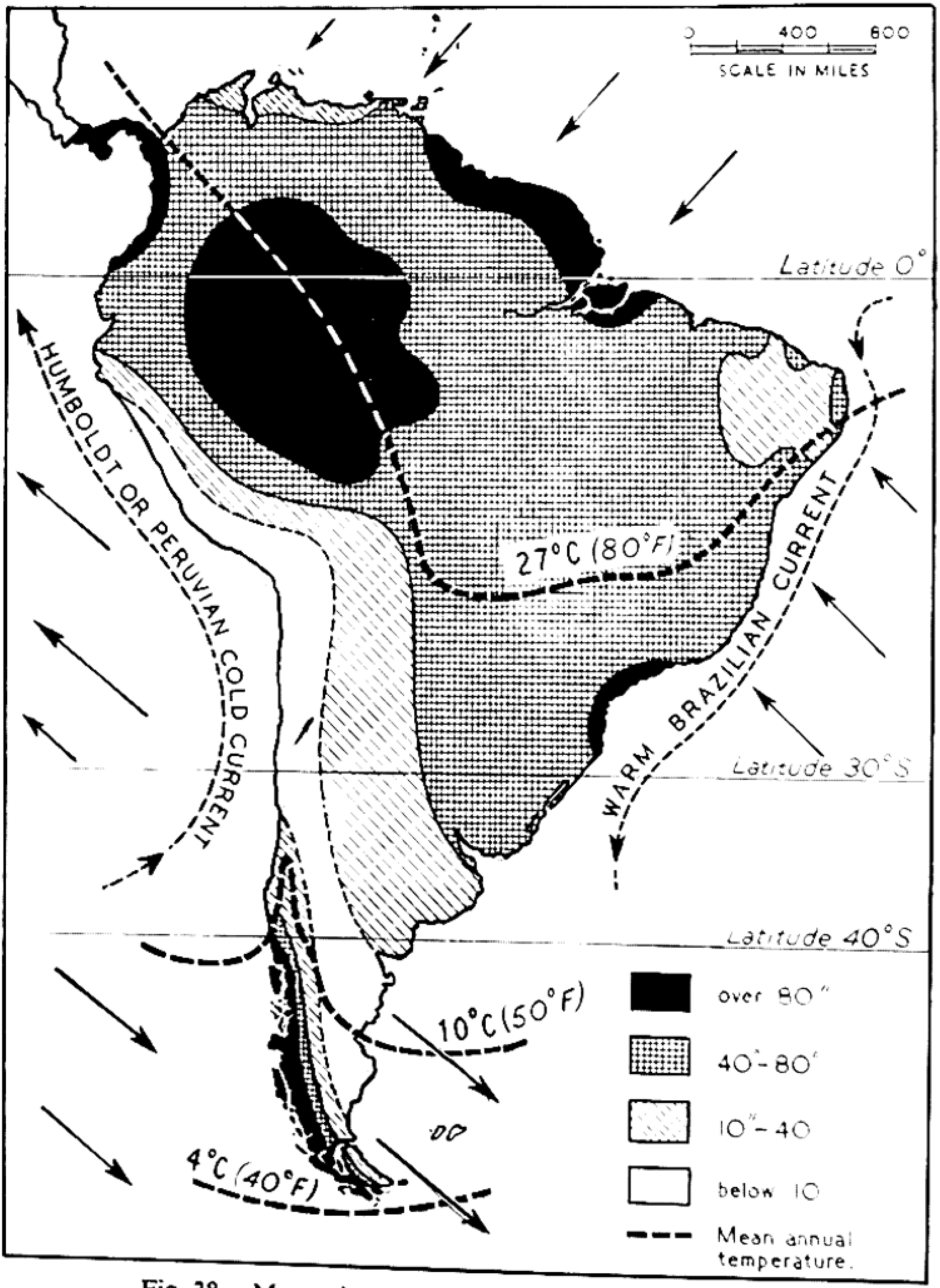


Fig. 38. Mean Annual Rainfall and Temperature.

an average annual temperature of 19° C. (66° *F.*), Rio de Janeiro (latitude 23° S.), a little further from the Equator, has an average annual temperature of over 22° C. (72° *F.*).

Large areas of highland within the tropics experience much lower temperatures than the lowlands and for this reason they are well populated. Quito, a town on the Equator, has an average annual temperature of 13° C. (55° *F.*). The average monthly temperatures vary by less than one degree (see figures for Quito on p. 237).

PREVAILING WINDS AND RAINFALL. The prevailing winds in South America are shown in Fig. 38. In general, the east coast, north of latitude 30° S., has on-shore winds from the east, and so receives a high rainfall. The Andes prevent these winds from reaching the west coast. On the Pacific seaboard, in the same latitudes, the winds blow roughly parallel to the coast from a south-easterly direction and are therefore dry. They have originated in an anticyclone in the Pacific Ocean and have not crossed the Andes from the east. South of latitude 40° S., the north-westerlies, or Roaring Forties, are the prevailing winds. Since the Andes are lower in these latitudes some rain is deposited on their eastern slopes, although the winds lose much moisture on the western side in crossing the mountains. As the north-west winds continue their descent eastward to the lower ground, the air becomes warmer and drier and thus most of Patagonia is in a rain shadow area.

In winter, when the sun is overhead north of the Equator, the north-west wind belt extends further north and thus brings rain to the Pacific Coast between latitude 40° S. and latitude 30° S. In summer, when the wind belts move south, these latitudes are in the south-east wind belt and have a rainless season. Such a climate, with hot, dry summers and warm, wet winters, is known as a Mediterranean climate.

SEASONAL RAINFALL. In a very broad way, it is possible to divide South America into seasonal rainfall belts according to when they get their maximum rainfall (Fig. 39).

(1) *No marked dry season.—*
  (*a*) The east coasts north of latitude 30° S. (except for a small part of the coast of Brazil—see p. 165).
  (*b*) The Amazon Basin.
  (*c*) The south-west coast, south of latitude 40° S.

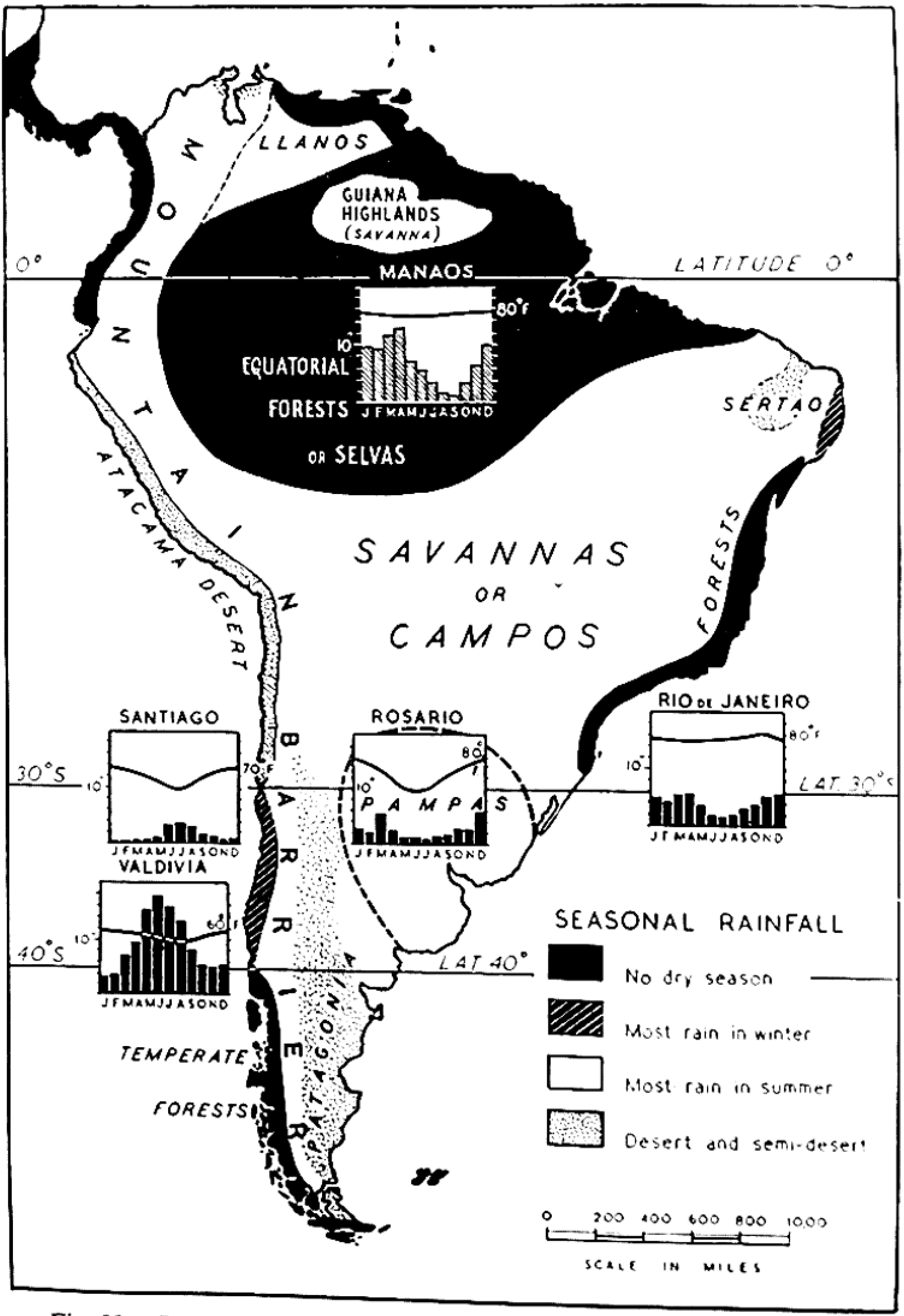


Fig. 39. Sketch Map of South America showing Seasonal Rainfall Belts (generalised).

(*a*) Except for a comparatively small strip of land round Cape S. Roque in north-east Brazil, the whole east coast of South America, north of the Plate Estuary, has no dry season but has a maximum rainfall in summer. On the north-east coast of Brazil, however, the rainfall is abnormal in that it is lower than elsewhere (less than 40 in. south of Ceara), and between Recife and Cape S. Roque the heaviest rainfalls are in winter. It is beyond the scope of this book to discuss the explanations which have been suggested for this anomaly. The table below shows contrasting seasonal rainfalls (to the nearest inch) of Recife or Pernambuco (*a*) and Santos (*b*), both on the east coast of Brazil:—

| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Summer) | | (Autumn) | | | (Winter) | | | (Spring) | | | |
| (*a*) | 3 | 3 | 7 | 11 | 13 | 14 | 14 | 8 | 3 | 1 | 1 | 1 |
| (*b*) | 13 | 11 | 11 | 9 | 5 | 6 | 5 | 5 | 6 | 6 | 6 | 10 |

Very low rainfall is also experienced in the inland area behind this coast which is known as the sertao.

(*b*) The Amazon Basin is the largest continuous expanse of land in the world where the rainfall is over 80 in. per annum. Although the rainiest months vary from place to place within the area and tend to occur when the sun is overhead, there is really no dry season anywhere. Few records are available; the rainfall figures in inches for Manaos, given below, serve to illustrate the regime.

| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Manaos | 9·8 | 9·6 | 11·8 | 13·0 | 7·5 | 5·1 | 3·0 | 1·8 | 1·5 | 3·9 | 6·4 | 10·3 |

Much of the rain in this region falls in thunderstorms. The heat and humidity make the atmosphere like that of a hot-house.

(*c*) The south-west coast of Chile lies in the north-west wind belt and therefore experiences on-shore winds. The average rainfall is over 80 in. a year, and in some areas it reaches over 200 in. a year. No month is without rain but the heaviest falls occur in winter.

(2) *Most Rain In Summer.*—Areas with rain mainly in summer occur over much of the Orinoco Basin and the Paraguay-Parana Basin. In general, rainfall decreases and the dry season becomes longer with distance from the Equator. Rainfall is more erratic and droughts may be experienced. The rainfall in inches of (*a*) Corrientes (Paraguay) and (*b*) Rosario (Argentina) illustrate some of these points:—

| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Annual Rainfall |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (*a*) | 5·7 | 4·9 | 5·3 | 5·3 | 3·5 | 3·2 | 1·6 | 1·6 | 2·7 | 4·6 | 5·1 | 4·8 | 48·3 |
| (*b*) | 3·7 | 3·2 | 5·3 | 3·1 | 1·8 | 1·5 | 1·0 | 1·5 | 1·6 | 3·5 | 3·4 | 5·3 | 34·9 |

(3) *Most Rain in Winter.*—Winter rains and summer droughts produce a typical "Mediterranean" climate on the west coast of Chile, between approximately latitude 30° S. and latitude 40° S. (Fig. 38).

(4) *Arid Areas.*—A strip of arid country crosses South America from the Pacific coast of Peru and Chile to the western part of Argentine Patagonia. On the Pacific Coast is the hot desert of Atacama. The prevailing winds are either parallel to the coast or off shore, and are therefore very dry, but the cold current off the coast also contributes to the aridity. Any winds which may cross this cool water will not take up much moisture. Then, when the winds reach the hot coastlands they are heated and capable of holding more moisture so that they do not yield rain. However, when these winds rise high enough up the mountain slopes to be cooled below saturation point, rain falls and gives rise to streams which are of great value for irrigation when they reach the dry lowlands.

The arid belt extends into the west of Argentina where rainfall is low and uncertain. Long and frequent droughts make irrigation necessary for agriculture (p. 199).

Further south lies the cool semi-desert of Patagonia which occupies the south-east of Argentina. Santa Cruz, a town on the coast, has an average annual rainfall of 6 in.

Other dry areas occur in the sertao of Brazil (Fig. 38) and on the coast of Colombia, north of Maracaibo Lake.

### Natural Vegetation

Natural vegetation depends on the type of soil and the climate. Although temperature conditions may influence the species of the plants, the broad natural vegetation belts depend to a great extent on the amount of rain and the season in which it falls, so that it is possible to make the following generalisations:—

| SEASONAL RAINFALL | NATURAL VEGETATION |
|---|---|
| No dry season .. .. .. | Forests. |
| Most rain in summer; dry winters .. | Treeless grassland and savanna. |
| Most rain in winter .. .. .. | Warm evergreen forest and dry forest. |
| Arid areas .. .. .. .. | Cacti and drought-resisting plants. |

FORESTS. Although South America has large tracts of forest, much of the timber is inaccessible. There is also a shortage of soft woods—the principal types used for building and pulping. The largest expanse of forest is the equatorial rain forest of the Amazon Basin, often called the Selvas. These are of evergreen, broad-leaved trees, chiefly of the hardwood type. It has been said that more species of tree may be found in one square mile of equatorial forest than in a hundred square miles of the coniferous forest of Canada. But seldom are many of the same species found growing together, so their economic value is thus decreased, since it is only possible to make use of the timber where it is relatively accessible, near the rivers.

The trees vary a good deal in size; many of the taller ones have their branches so interlaced that little light gets through the dense foliage and there may be no undergrowth. Parasitic orchids bloom on the tops of the trees. Elsewhere, where the trees are thinner, lianas and creepers hang from the branches and there are tangled thickets of undergrowth. Many rubber-bearing trees, of which the most important is a species called Hevea (p. 173) grow wild in these forests. Brazil nuts are also of economic importance.

In the campos or savanna area, on the west of the Brazilian Highlands, there are stands of more open forest including trees of economic importance such as the Parana Pines, which are soft woods and therefore in demand for building, and the hard quebracho, which is a source of tannic acid. The yerba maté bush, the leaves of which are widely used to make a drink resembling tea, also occurs in the campos. Temperate forests are found above the tropical forests on the upper slopes of the Andes. South-west Chile, south of latitude 35° S., is also clothed with temperate forests: beech and conifers are the commonest trees.

SAVANNAS AND TREELESS GRASSLANDS. Passing north or south from the Amazon Basin, the rainfall decreases and the forests thin out, giving way to the parklands or savannas of the campos. Here are wide expanses of tall grasses with scattered trees, many of which are acacias. Only the watercourses are wooded. In the Orinoco Basin, where tree growth is limited by flooding, the natural vegetation is mainly grassland—the llanos. The vegetation of the llanos is not uniform. Tall coarse grass and patches of scrub grow in the drier parts, while shorter grass is found in the wetter areas. The banks of streams are often lined with trees.

South of the campos the rainfall decreases and is less reliable. There are often droughts which prevent the growth of trees and the large grassland areas of the pampas result. Since temperatures in the pampas are comparable with those experienced in the temperate zone [Buenos Aires has average temperatures of 23° C. (*74° F.*) in January and 9° C. (*49° F.*) in July], they are known as temperate grasslands. The llanos, however, situated in the tropics, have a mean annual temperature between 21° C. (*70° F.*) and 27° C. (*80° F.*) and are therefore described as tropical grasslands.

WARM EVERGREEN AND DRY FOREST. The summer drought of Middle Chile produces a drought-resisting vegetation similar to the maquis of Southern Europe. Evergreen laurels and acacias are characteristic of the wetter areas, while thorny shrubs and cacti are typical of the drier north.

ARID AREAS. Much of the Atacama Desert has too low a rainfall for vegetation. A few cacti and lichens are capable of surviving on the moisture from fog and dew. Only in stream courses are a few thorny trees, such as acacia, to be found. These valleys often form oases which provide valuable farmland when irrigated.

East of the Andes, the arid west of Argentina is another dry area where agriculture is only possible near streams which run down from the mountains. The rest of the area has a meagre cover of scrub and cacti which in some parts affords pasture for goats. Further south lies the semi-desert of Patagonia. In the north there is only poor grass with occasional cacti, but further south the grass improves and is grazed by sheep. Much of Patagonia consists of stony plateaux with so scanty a vegetation that they resemble true deserts.

Other arid areas covered with desert scrub are in the sertao (Fig. 39, p. 165) of North-East Brazil and on the coast of the Caribbean Sea in northern Colombia.

# CHAPTER XI

## BRAZIL AND PARAGUAY

### BRAZIL

Brazil occupies a little over one-half of South America and is the fourth largest country in the world. Although larger than the United States of America, its population of eighty-two million is smaller, though it is increasing very rapidly. Half the population is under fifteen years of age.

The country may be divided into three main regions:—

(i) The Amazon Lowlands.

(ii) The Interior Lowlands and Plateaux.

(iii) The East Coast and adjacent Highlands.

### The Amazon Lowlands

The Amazon Basin covers an area as large as the United States east of the Rockies, yet has no more than two million inhabitants. It is drained by a system of rivers spectacular in size with some 13,000 miles of navigable waterways. Ocean-going steamers can ascend the River Amazon for 2,300 miles, while river steamers use its main tributaries for distances varying from 500 to 1,000 miles. Near its mouth the Amazon resembles a sea many miles across and the water it discharges lessens the salinity of the Atlantic for over 200 miles from its mouth.

Shaped like an oval, the Amazon Lowlands are almost surrounded by high land. They are widest to the west of Manaos and narrow considerably where the river cuts through the highland rim between the Guiana and Brazilian plateaux. Where the tributaries leave the surrounding highlands there are often rapids and waterfalls.

**Climate.** While not excessively hot, the climate is extremely humid and uncomfortable to live in. There is no dry season but, in certain months, which vary in different parts of the basin, the rains are exceptionally heavy, falling mainly during the day in violent storms. Then the river waters may rise anything from 35 to 70 ft, sweeping down trees and soil into the river and flooding areas often 50 to 100 miles across.

NATURAL VEGETATION. The heat and high humidity favour the growth of Equatorial Rain Forests or Selvas. The trees, almost leafless to the tops, grow close together, struggling towards air and light. On the upper surface is a roof of green relieved by the brilliant colours of parasitic orchids and the vivid hues of tropical birds and butterflies. No rays of sunlight penetrate the leafy cover. Below is damp gloom and decay. A maze of twisted lianas and undergrowth obstruct the way where the cover is less dense. In other places, rotting vegetation and fungi make breeding places for snakes and insects which carry the deadly germs of malaria and yellow fever. Monkeys abound.

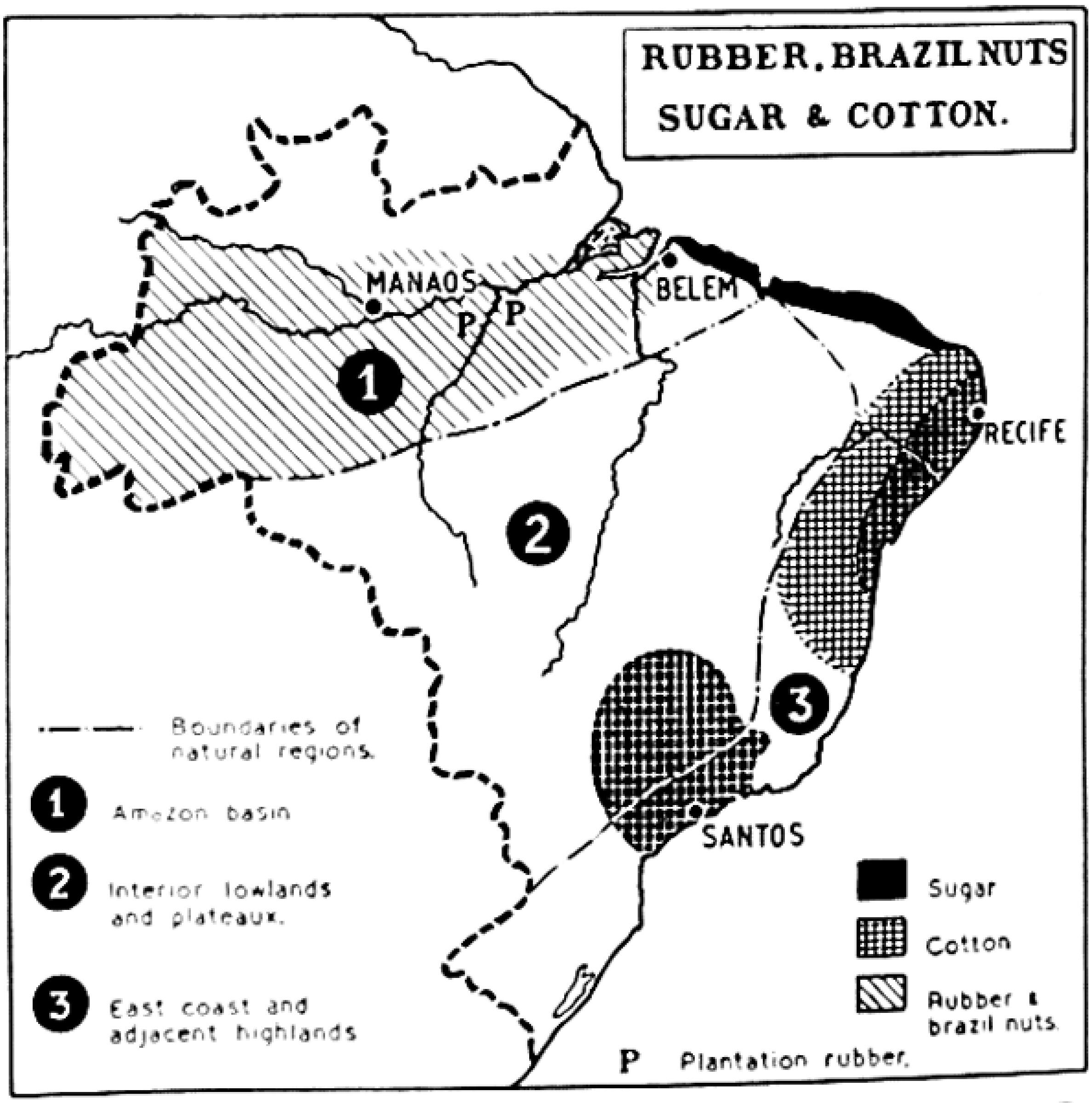


Fig. 40. BRAZIL: NATURAL REGIONS AND AREAS PRODUCING RUBBER, BRAZIL NUTS, SUGAR, AND COTTON.

A few scattered groups of primitive Indians gain a living near the rivers by fishing and collecting wild products.

They usually live in thatched shelters on the river banks. A few live in settlements in the forests, making temporary clearings by burning the trees, growing one or two crops, and then abandoning the site for a new one.

PRODUCTS OF THE AMAZON FORESTS. The chief economic products are rubber and Brazil nuts. Several species of tree yielding rubber grow wild in the forest. By far the most important is the Hevea rubber tree. Sixty or seventy years ago, Brazil was the only rubber-producing country in the world. In the early nineteenth century small quantities of rubber were already being exported but the boom did not come until the early peak of production was reached in 1912. Money was plentiful and the rubber port of Manaos, with fine buildings, grew up at the junction of the Negro and the Amazon. Then came a decline when rubber production began on plantations in South-East Asia. In 1876 an Englishman brought Hevea seeds to Kew Gardens in London and young rubber trees were grown from these and transferred to Ceylon, trees which eventually multiplied and furnished others for plantations in Malaya and Sumatra. Rubber trees take six or seven years to mature and yield rubber, but by 1910 the Asiatic plantations were producing rubber more cheaply than Brazil, with the result that prices fell and brought ruin to many Brazilians. Today the Amazon forests only produce about 1 per cent. of the world's supply.

Most of the rubber in Brazil is collected from wild trees by Indians and Brazilians from other parts. Like most trees in the selvas, rubber trees are scattered, and large distances have to be covered in difficult and unhealthy conditions to collect the latex. Usually, the trees are tapped in the morning by cutting a gash and fixing a cup below it, into which the latex drips. The cups are emptied later in the day and the latex is cured by holding it over a smoky fire. In this way balls of crude rubber are obtained. At the end of the season these balls are taken by canoe to a collecting centre and from these the rubber goes to a larger depot. Since the Amazon Basin is the home of the Hevea rubber tree, one might expect plantations of rubber to be as important here as in South-East Asia but the unhealthy climate, lack of efficient labour, and inter-state regulations create difficulties. Almost all the land which has been cleared and planted with Hevea near the Tapajoz River is owned and run by the Ford Motor Organisation of the U.S.A. Motor tyres are manufactured in local factories.

Brazil nuts come second to rubber among the forest products. Fallen fruits, containing fifteen to twenty nuts, are picked up by collectors and provide a valuable source of oil.

The lumbering industry is small, since most of the timber is hard and heavy, and thus difficult to cut and float down the rivers. Moreover, each type of tree is widely scattered in the forest and the undergrowth is often dense. It is unlikely that the industry will ever be very important.

An oilfield is now being developed on the right bank of the Madeira River about 100 miles from its confluence with the Amazon.

TOWNS OF THE AMAZON BASIN. *Manaos* (175,000) is the chief inland town of the Amazon Basin, 1,000 miles from the sea on the Rio Negro near its junction with the Amazon, and not far from the point where the Madeira River joins the main stream. Manaos thus commands water routes from several directions. The town grew up as a port during the rubber boom. It still exports rubber but has only a shadow of its former glory. Ocean-going vessels keep up a small foreign trade which also includes Brazil nuts and timber, while river steamers bring in products from a wide hinterland.

*Belem* (*Para*) (402,000) is a port on the wide mouth of the Para River. Formerly a great rubber port, it has declined in importance.

## The Interior Lowlands and Plateaux

A large part of Brazil consists of the interior lowlands and plateaux known as the campos. In the eastern part the land rises to the plateaux of Motto Grosso and Goyaz; to the west, it sinks to marshy lowlands bordering the Paraguay river.

CLIMATE AND VEGETATION. Although temperatures vary through its 20° of latitude, summers in the campos are hot, often averaging over 27° C. (*80° F.*). Winters are warm, the average annual range of temperature being about 6 C°. (*10 F°.*). Most of the rain falls in heavy thunderstorms in summer. Drought is characteristic of the winter. The average monthly figures for Corumba (381 ft) are as follows:—

| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Temp. in °C. | 27 | 27 | 27 | 26 | 23 | 21 | 22 | 23 | 25 | 26 | 27 | 27 |
| Temp. in °*F.* | *80* | *80* | *80* | *79* | *74* | *69* | *71* | *73* | *77* | *78* | *80* | *80* |
| Rainfall in inches. | 6·4 | 6·7 | 4·8 | 5·0 | 3·3 | 1·9 | 0·3 | 1·3 | 2·3 | 3·9 | 6·0 | 7·4 |

The characteristic vegetation of the campos is savanna. In the dry season the vegetation is scorched and the grass dries up but after the rains the landscape becomes green and succulent grasses appear.

PRODUCTS AND OCCUPATIONS. Cattle rearing is the chief occupation. Millions of low-grade cattle graze over large unfenced estates. In spite of attempts to improve the herds by crossing with hardy Indian zebu stock, the animals do not make good meat and are kept chiefly for their hides and for dried or jerked beef. Although the vast areas of grassland favour cattle rearing, it is unlikely that the campos will become a big meat-producing region in the near future for the following reasons:—

(*a*) The region is isolated and communications are poor; the River Paraguay is the natural outlet but long distances must be travelled to reach the sea.

(*b*) It is unlikely that pure bred stock will be brought to the campos until more favoured areas in Brazil and Argentina have been fully developed.

(*c*) Like all tropical grasslands, the campos suffers from ticks and cattle diseases.

(*d*) Periods of drought make it necessary for the cattle to have a large area for grazing and fencing of the large estates becomes impracticable. Lack of fencing makes it difficult to introduce good stock without large scale mixing.

**Towns, Transport, and People.** Much of the campos is sparsely peopled, with less than one person per square mile. Bands of nomadic Indians live a primitive existence in parts of the area, hunting and collecting food. There are few white people and these live mainly on ranches or in the towns. Most of the cattle men or gauchos are mestizos who travel long distances on horseback.

*Brasilia* (400,000), the new capital of Brazil, lies 600 miles north-west of the port of Rio de Janeiro. It is boldly planned, in the shape of a bow and arrow, with fine new buildings and large blocks of residential flats. The decision to move the capital was made in order to develop the thinly-peopled interior, to remove the seat of Government from the hot, wet coastal lowlands to a more stimulating climate, some 3,000 ft above sea level, and to unify the country—coastlands and plateau. A site was chosen at the confluence of two rivers where there was a good water supply and potential hydro-electric power.

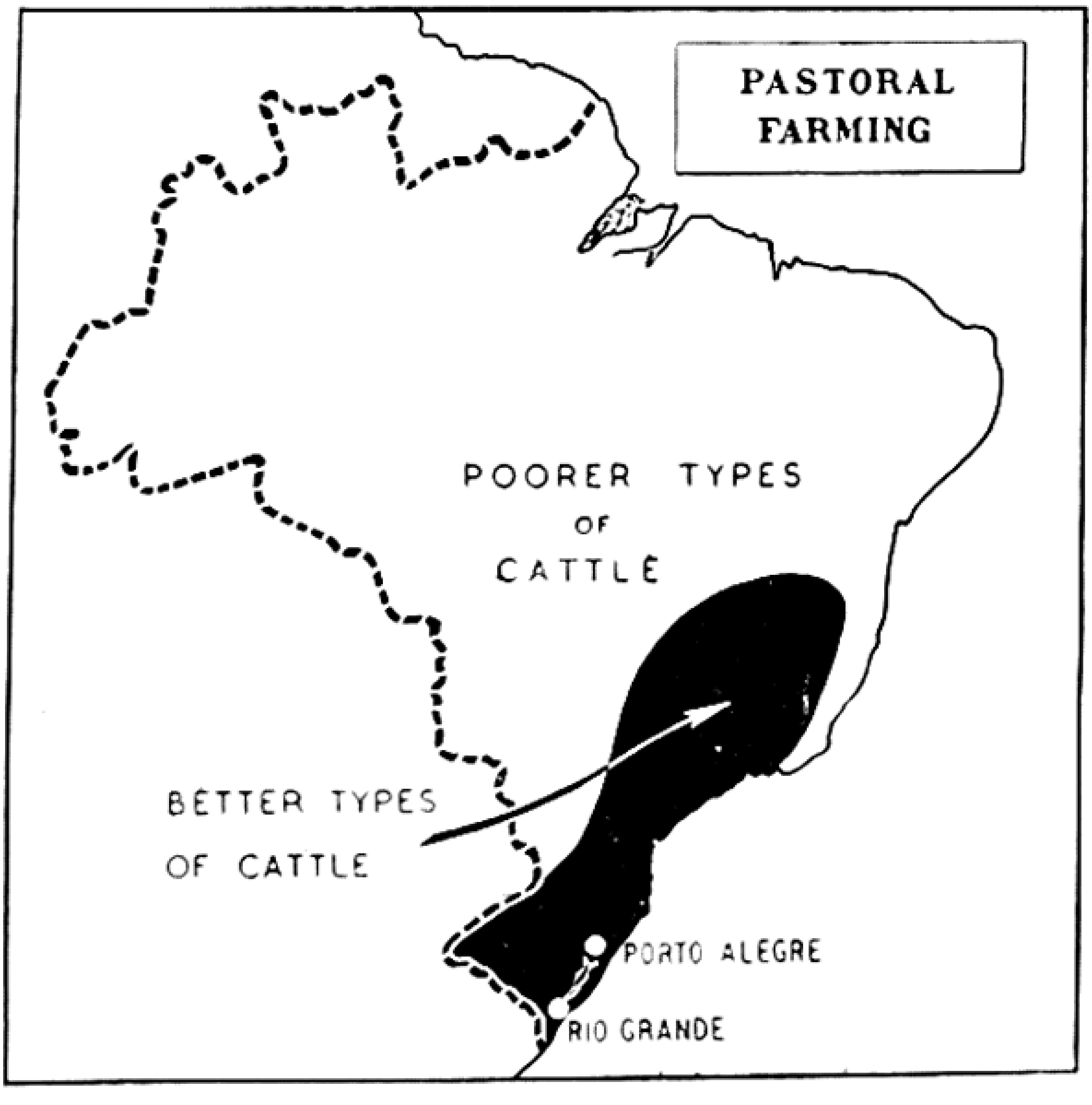


Fig. 41. Brazil: Pastoral Areas.

Although a railway runs to Sao Paulo and there are good roads to the coast, Brasilia still depends to a large extent on air transport. Thousands of destitute families from north-east Brazil have established themselves in satellite settlements around Brasilia in the hope of a more prosperous life.

*Goyaz*, capital of the State of Goyaz, is a modern town, connected by rail to the line from Brasilia to Sao Paulo.

*Corumba* is a river port at the head of river navigation of the Paraguay, 1,400 miles from the sea and a ten-hour boat journey to the nearest railway which crosses the southern part of the campos, joining Sao Paulo with the Bolivian border.

### The East Coast and Adjacent Highlands

The eastern edge of the Brazilian Highlands lies close to the east coast. The coastal plain is widest in the north and the highlands lower and less of a barrier. In the central part, particularly from Vitoria to Porto Alegre, the eastern edge of the highlands forms a high escarpment which, in places, rises to nearly 10,000 ft. South of Porto Alegre, the coastal plain widens and the coast is fringed with lagoons and sand-bars. Since the watershed is near the coast, the largest rivers flow inland to the Parana. The chief exception is the Sao Francisco which flows northwards and, after making a sharp elbow bend, reaches the sea between the states of Bahia and Pernambuco.

The east coast and adjacent highlands may be divided into three regions which differ in products and development, although they are not separated by precise boundaries:

(*a*) The North-East States, roughly from Sao Luiz to the River Sao Francisco.

(*b*) The Central States, roughly from the River Sao Francisco to the southern borders of Sao Paulo State.

(*c*) The Southern States of Parana, Santa Catharina, and Rio Grande do Sul.

THE NORTH-EAST STATES. The coastal plain of this region has high temperatures throughout the year and, except near Cape Sao Roque (see p. 166), the rainfall is abundant and reliable.

The first Portuguese settlement was made at Salvador in 1502 and the cultivation of sugar-cane began almost at once. Descendants of negro slaves brought in to work in the plantations, now form a big proportion of the population (see p. 154). Today, sugar and cotton are the chief money crops of this area. The high temperatures and heavy rain suit sugar-cane well. In the colonial period the industry was prosperous and large quantities were exported to Europe. Then, in the early eighteenth century, gold, discovered in the state of Minas Gerais, proved a counter-attraction and, at the same time, the West Indian cane-sugar industry was developing and beet-sugar growing began in Europe.

Today, there are many small cane-fields run by inefficient methods operating side by side with large commercial plantations equipped with modern crushing machinery. Where it is too dry for sugar, cotton is grown mainly in an area lying between Cape Sao Roque and Recife (Fig. 40). The area has suffered in competition with the more cheaply produced North American cotton.

More recent plantation products of growing importance are waxes and oils obtained from trees which also grow wild in the drier parts. One of the most important is the carnauba palm, which yields wax used in making gramophone records.

The chief towns of the North-East States are ports, each serving a small hinterland to which it is connected by a railway.

*Recife* (*Pernambuco*) (790,000), situated on a small natural harbour, exports sugar. *Recife* and *Natal* are both South American termini for trans-Atlantic air lines from Europe and West Africa. They also lie on an air route which connects the principal towns of the north and east coasts of South America.

The towns of north-eastern Brazil are now developing industries, drawing power from hydro-electric stations on the Sao Francisco River.

The area behind the coastal plain is mainly hilly country under 1,500 ft in height but is occasionally broken by low mountains over 3,000 ft. This is the sertao, a land of sparse and erratic rainfall subject to disastrous droughts and floods. Much of the vegetation consists of cactus and thorny scrub known as caatanga. The sertao may be without rain for two years when the wells dry up and the trees lose their leaves.

In the rainy periods grass clothes the slopes and the area becomes green again. In his book, *South American Journey*, Waldo Frank describes the region as follows: "The sertao's mood is anger. The cacti bare their stilettos. The mesquite and shrubs are horned furies. The trees writhe, tumble and trench themselves underground; teeth in every branch and on every leaf a needle. Go a yard through the sertao; unless you ride armoured like a medieval knight, there will be blood on your legs and on the breast of your horse."

The chief occupation is cattle rearing but during droughts great numbers die and the scanty population, which consists mostly of whites or mestizos, migrates to the coast until rains come to the parched land. Cotton and sugar are cultivated where irrigation is possible (Fig. 40). Carnauba palms and other oil-bearing trees grow near the watercourses. The chief products of the region are hides, wax, and a long silky variety of tree cotton used in the manufacture of motor tyres. Communications are poor and there are no important towns. Throughout north-east Brazil there is much poverty and some families have migrated to other parts of the country hoping for a better standard of living.

THE CENTRAL STATES. Between Rio de Janeiro and Santos, the edge of the Brazilian Highlands rises from the coast to form a bold escarpment, leaving little or no coastal plain. Behind the escarpment the plateau is dissected by many streams draining westward to the Parana. A notable exception is the Rio Paraibo which flows in a wide fertile valley behind, and parallel to, the escarpment, reaching the sea some 150 miles north of Rio de Janeiro. North of the Tropic of Capricorn the escarpment is lower and is breached by several eastward flowing rivers. The coastal plain also widens considerably to the north.

On the coast temperatures are high and the rainfall is well distributed throughout the year, reaching 80 in. in some places. Inland, altitude gives lower temperatures: at Sao Paulo, for example, about 50 miles inland, the coldest and warmes tmonths have average temperatures of 14° C. (*58° F.*) and 21° C. (*69° F.*) respectively, whereas at Santos, on the coast, the average monthly temperatures range from 19° C.

(*66° F.*) to 24° C. (*75° F.*). The coastal escarpments cut off some of the rain-bearing winds but annual rainfalls of from 40 to 60 in. with a summer maximum, are fairly typical on the plateau.

The rainy areas of the coast and escarpment are heavily forested. West of the escarpment, forest and grassland intermingle, while on the drier parts and on the poorer soils, savanna predominates. In many places trees have been cut down to clear land for cultivation. More recently, groves of eucalyptus trees have been planted, and they now form a characteristic feature of the landscape, especially near towns and villages. It is hoped that they may eventually provide timber.

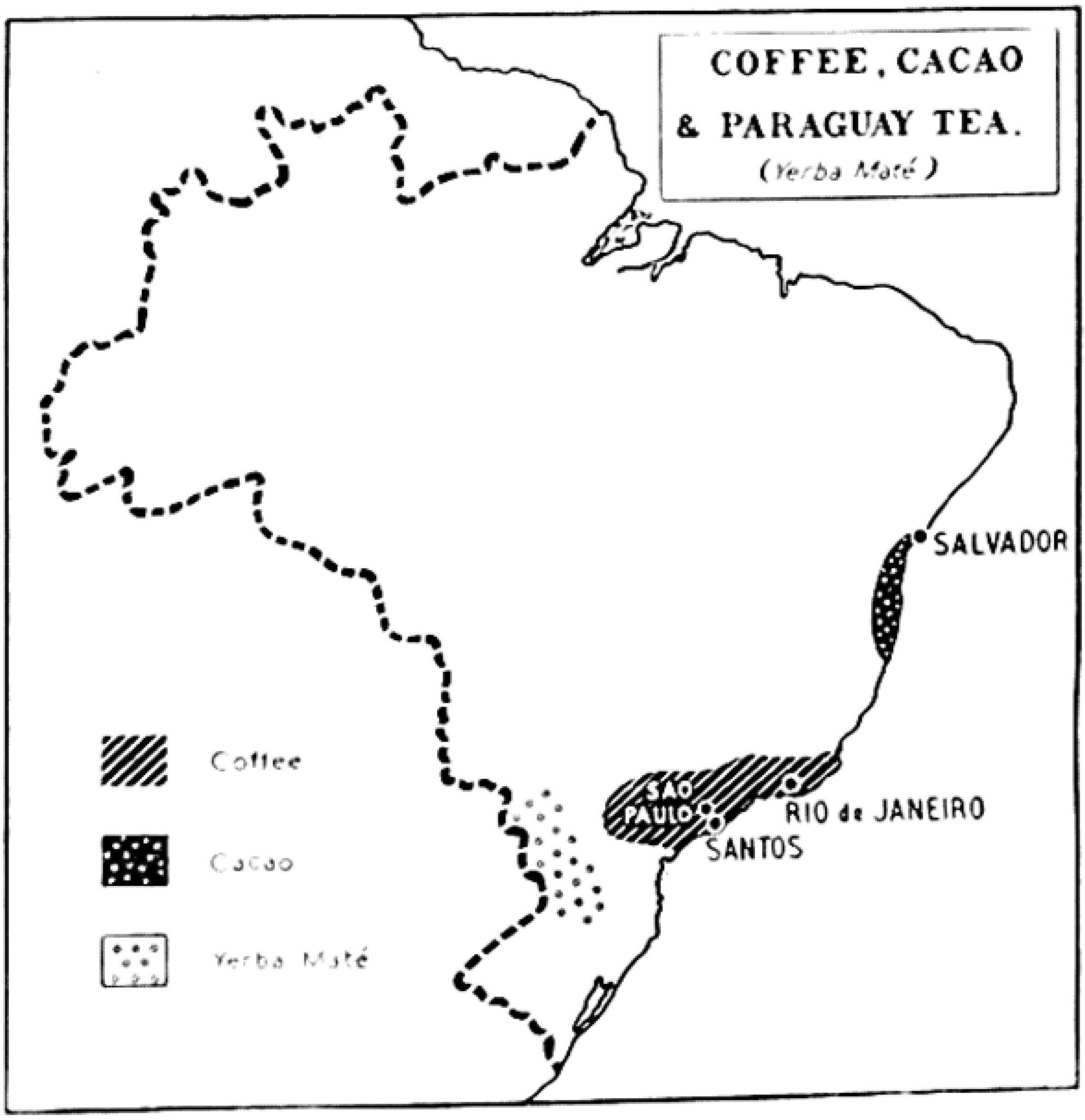
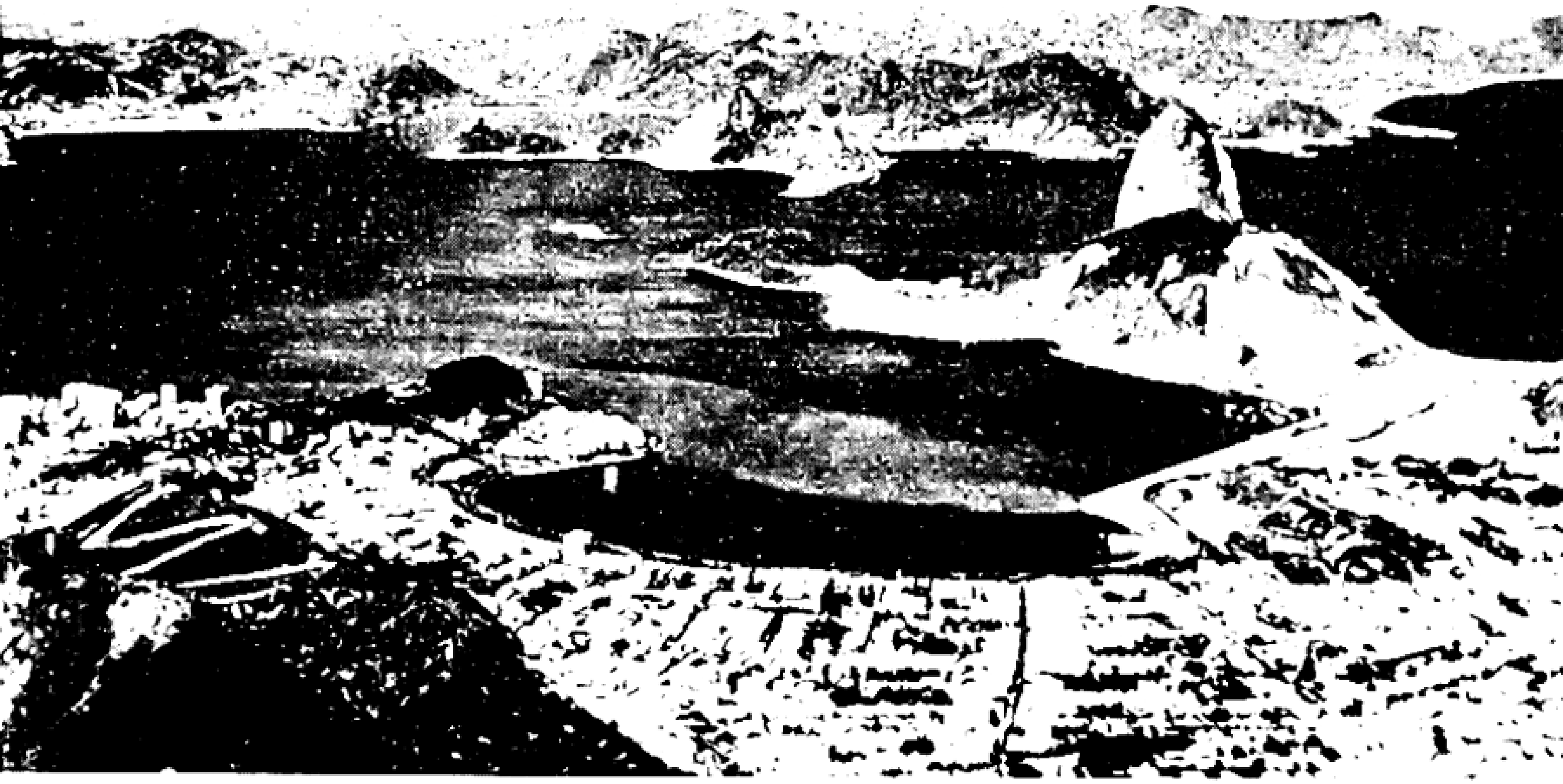


Fig. 42. BRAZIL: CROPS OF THE SOUTH-EAST.

The Central States form the most prosperous part of Brazil, and take the lead both economically and culturally. Although many crops are grown, nearly half the cultivated land is used for growing coffee.



*Above* Brazil. Rio de Janeiro. (*Picture Post.*)
*Below* Brazil. Drying Coffee Beans in the Sun. (*Exclusive News Agency.*)

*Above.* BRAZIL. THE CITY AND HARBOUR OF SANTOS. (*Exclusive News Agency.*)
*Below.* BRAZIL. A STREET SCENE IN SAO PAULO. (*Exclusive News Agency.*)

Coffee is grown on big estates or *fazendas*. The trees are planted on sloping land and they come into production from five to six years later, bearing fruits which look like cherries. Each fruit has two "stones" which are the coffee berries. The fruit is picked, sorted, and washed, and finally crushed to extract the berries which are then dried in the sun on hard floors, care being taken to protect them from rain. The husks of the berries are then removed and after sorting and grading the berries are packed into jute bags. At this stage they are green and will keep for long periods. Before being used the berries are roasted, but since the coffee soon loses its flavour after roasting, this process is usually left until it is about to be used in the consuming countries. The U.S.A. (which drinks two-thirds of the world's coffee) takes most of Brazil's surplus after the home demand is satisfied.

The Brazilian Highlands, particularly in the State of Sao Paulo, suit coffee for the following reasons:—

(i) There are many hill slopes which supply good drainage, so necessary for coffee growing.

(ii) Beds of lava on the highlands weather to a fertile red soil (terra rossa), rich in iron and potash—a soil which produces coffee with a superior flavour.

(iii) Dry, warm, and sunny autumns favour the harvesting and drying of the berries.

(iv) The coffee-growing districts are near the coast and, in spite of difficult slopes, a network of railways links the fazendas with Rio de Janeiro and Santos.

(v) Italian, Spanish, and Japanese immigrants provide an efficient source of intelligent labour.

Brazil produces more than half of the world's coffee. Because of the natural advantages, and the big demand for coffee in Europe and America, the industry was for many years very prosperous indeed and large fortunes were made. Large areas were planted with coffee trees at the expense of other cash crops. Eventually Brazil grew more coffee than she could profitably sell and, since her economy depended chiefly on the one crop, the situation became very serious. The

Brazilian Government restricted new plantings and ordered the destruction of the surplus crop. Attempts were made to plough some of the surplus coffee into the ground but it proved of no value as a fertiliser. New uses for coffee have to some extent eased the problem of over-production. One factory at Sao Paulo uses the beans as a raw material for making plastics. But with increasing competition from coffee-growing countries in Africa, Brazil's dependence on coffee remains a problem.

It is clear that the dependence on one crop is economically unsound. The Central States must produce other cash crops. Already many of the fazendas, while concentrating on coffee, grow a certain amount of cotton. American upland varieties are cultivated chiefly in the State of Sao Paulo where the soil and climate are favourable. The greater part of the crop is absorbed by the growing textile industry of the Central States.

Cocoa is well suited to the hot, wet coastal plain of Bahia. The chief producing area is around Salvador (Bahia). The plantations are usually small and are planted on land cleared of forest, seldom more than forty miles from the coast. Cocoa beans are sent to small ports on the coast and thence by sea to Salvador where they are prepared for export. Brazil is second to Ghana in cocoa production but primitive methods and careless cultivation hinder the industry which could easily become as important as that of West Africa. Conditions, however, are improving. Sugar-cane cultivated in the Central States provides about half the total for Brazil.

Bananas are grown widely in the coastal area of the Central States. Oranges of delicious flavour grow in many parts. Brazil is second only to the U.S.A. in the production of oranges, many of which are sent to Britain.

The chief food crops are maize, manioc, beans, rice, fruit, and vegetables. Tobacco is also grown for home consumption, particularly in Bahia.

Cattle are raised on the pastures which cover large areas of the Central States. Many of them are low-grade animals and produce hides and dried beef, but the demand for good beef in European markets has led to the introduction of pure-bred animals. Further encouragement has been given by the setting up of modern meat-packing plants.

The Brazilian Highlands, like the plateau of South Africa (p. 136), are rich in minerals. Most of them come from the State of Minas Gerais, which means "general mines". Although gold was the chief cause of settlement in this area production is now small; the two richest mines are near Belo Horizonte. Uranium has also been found in this area.

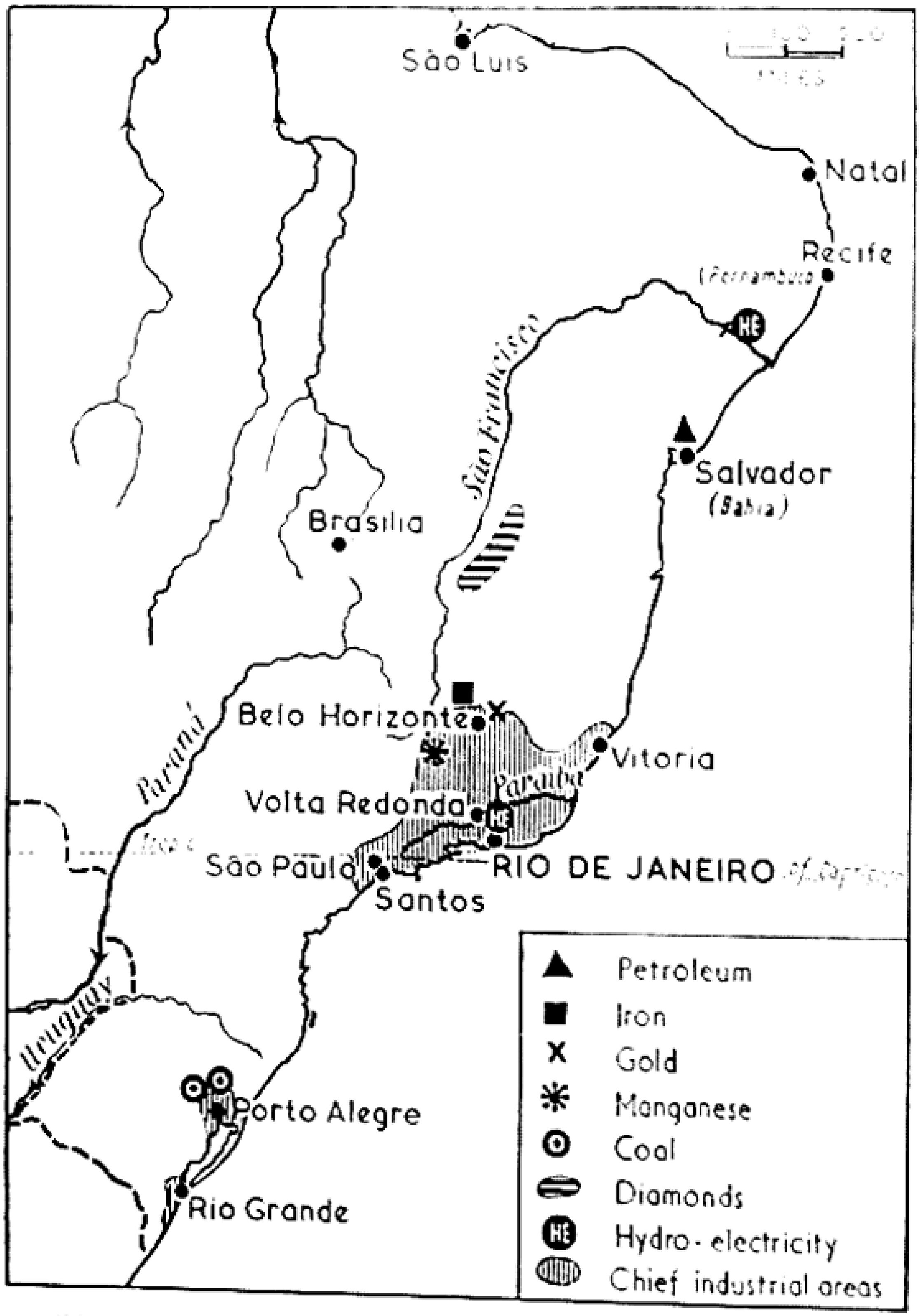


Fig. 43. BRAZIL: MINERAL AND POWER RESOURCES.

In 1729 diamonds were discovered. The industry was never a large one but Brazil supplies some commercial diamonds for cutting and for precision instruments, since diamonds are the hardest mineral known. Rock crystals (quartz), used in the radio industry, and mica, used in electrical insulation, are also produced.

Manganese, used in the manufacture of hard steel, is mined in the state of Amapá, near the border of French Guiana where a short railway connects the mines to the port of Macapá on the Amazon. In Minas Gerais manganese workings supply the Brazilian steel mills. Perhaps the most important mineral deposits of Brazil are the masses of easily worked high-grade iron ores which give an average yield of 67 per cent. iron. The chief centre is at Belo Horizonte. The railway line linking this area with the port of Vitoria deals with the increasing quantities of ore mined for export to Britain and the U.S.A. Unfortunately Brazil lacks good coking coal and this has hampered her own steel industry, but despite this, steel output is steadily increasing. The chief mills at *Volta Redonda* (80,000) on the River Paraiba, which produce more than half Brazil's steel, are run on up-to-date lines by the State. This is the largest steel centre in South America. The town is well laid out with parks and gardens, welfare clinics, and workers' restaurants. Other minerals from the plateau include beryllium, thorium, and bauxite. Aluminium is being produced from bauxite, using hydro-electricity.

The Central States have rightly been called the "Heart of Brazil". In them are found the chief industrial area, the largest towns, and the principal hydro-electric plants of the country. The largest hydro-electric dam in South America holds back the water of the Rio Grande at *Furnas* in the State of Minas Gerais below its confluence with the Sapucai River. The station supplies electricity to the industrial areas of Belo Horizonte, Sao Paulo, and Rio de Janeiro. A network of railways links Rio de Janeiro and Santos with the producing areas of the highlands and there are connections with Argentina and Uruguay. A good road system serves the coffee district and air lines link the larger towns.

*Rio de Janeiro* (4,000,000), the second largest city of Brazil, is situated on a bay world-famous for its beauty and has an excellent harbour. It is an important industrial city with textiles as the chief product, and it shares with Santos the handling of most of Brazil's trade, but is mainly concerned with import trade. An air shuttle service operates between Rio de Janeiro and Brasilia, the capital of Brazil (see pp. 176-7).

*Sao Paulo* (4,500,000) is the largest city in South America and the fastest growing city in the world. It is a great industrial and commercial centre—a city of skyscrapers and modern highways. Many races of people are found there, especially Japanese, Italians, Portuguese, Spaniards, and Germans, and the population is still increasing. This is the result of the amazingly rapid growth of industry based mainly on hydro-electric power from the rivers which flow from the Brazilian plateau to the Parana. The focus of a network of roads and railways, Sao Paulo is the chief centre for the coffee industry. Its industrial growth has been amazing. Three-quarters of all the manufacturing of Brazil is in or near the city. Industries include textiles (cotton and silk), chemicals, food processing, and rapidly expanding motor car factories run by foreign capital.

*Santos* (270,000) is the seaport for Sao Paulo and the world's most important coffee port. It has excellent warehouses which handle more than half the exports of the country. Dock facilities are being rapidly improved.

*Belo Horizonte* (694,000) is in an iron mining and industrial area, and *Salvador* (660,000) is the chief cocoa port.

THE SOUTHERN STATES. In the neighbourhood of Porto Alegre the escarpment formed by the eastern edge of the Brazilian Highlands ends and the inland country becomes lower. Several eastward flowing rivers form wide alluvial tracts in their lower courses. The coast is low and fringed with lagoons and sand-bars.

Summer temperatures are similar to those experienced further north near Santos, but winters are cooler and frosts may occur, though they are rare except on the higher ground. Porto Alegre averages 24° C. (*76° F.*) in the warmest month and 13° C. (*56° F.*) in the coolest. Rainfall is well distributed and is more than 60 in. in most areas.

The vegetation shows a transition from deciduous forests in the north to wide stretches of grassland in the south. On the whole, grassland predominates.

The chief occupation of the Southern States is cattle rearing. Many animals are low grade and provide hides and dried beef. There are, however, better breeds which are converted into chilled, frozen, and canned meat in the packing plants at Rio Grande do Sul and other centres. In the south sheep produce wool for local needs but the climate is too warm for good wool production. Many pigs are reared, mostly for local consumption. Horses, asses, mules, and goats are also bred in great numbers. Brazil has now outstripped Argentina as a livestock producer.

Agriculture is not so important as pastoral farming. Maize and a small amount of wheat and rye are the chief cereals, and Italian settlers cultivate vines which are the chief source of Brazilian wine. Other food crops include beans, manioc, and potatoes. Tobacco is also grown, chiefly in the State of Rio Grande do Sul.

The western part of this area yields two forest products. Parana pine is the chief source of softwood in Brazil; yerba maté is a bush, the leaves of which, when dried, are infused to make a drink resembling tea (p. 189).

The people of the Southern States include many German and Italian settlers and their descendants. They are mostly of peasant stock and are hard and intelligent workers.

Low-grade coal is mined near Porto Alegre, and near the southern border of the state of Santa Catherina. Much of it is used for producing gas and power for Porto Alegre.

The chief towns of the Southern States are on the coast.

*Porto Alegre* (650,000) is a large industrial town making use of products from its hinterland. Leather is made from local hides, and wool is manufactured. Porto Alegre is not a seaport but is situated on a shallow lagoon shut off from the sea by a long sand-bar. The town commands several routes inland and is connected by rail to an inland line which links the Central States with Argentina and Uruguay.

*Rio Grande* is fifth among Brazilian ports. It has a meat-packing industry and exports meat products.

### The Trade of Brazil

Brazil is the most highly-industrialised country in South America and is self-supporting in many goods. The chief industries are textiles, motor cars, foodstuffs, chemicals, metals, and building. Nearly all the output is consumed within the country, though some iron and steel goods are exported.

The following table gives the chief exports (in millions of U.S. dollars) in 1963.

| | |
|---|---|
| Coffee | 748 |
| Cotton | 114 |
| Sugar | 72 |
| Iron ore | 70 |
| Cocoa and cocoa butter | 51 |
| Timber (pinewood) | 37 |

The chief imports in 1963 (in millions of U.S. dollars) were:—

| | |
|---|---|
| Machinery, motor cars, etc. | 432 |
| Raw materials for industry etc. | 423 |
| Foodstuffs | 251 |
| Chemicals | 179 |

Over one-third of the exports go to the U.S.A. and over one-third of the imports come from the U.S.A.

## PARAGUAY

Paraguay, lying astride the Tropic of Capricorn, is a land-locked country almost in the centre of South America. Although nearly one and a half times as large as Great Britain, the country contains only two million people; 300,000 live in the capital city of Asuncion. Over 90 per cent. of the people are mestizos with a large proportion of Indian blood. They form the peasant class and are generally poor and often illiterate. A few families of pure European descent can be traced back to the early Spanish colonists and to European immigrants who have entered the country since 1870 and they play an important part in the political and social life of the country, living chiefly in the towns and on the larger farming estates. In the more inaccessible parts of the country there are many nomadic tribes of Indians.

Paraguay is the smallest and most backward country in South America. As a result of a disastrous war waged against Argentina, Brazil, and Uruguay between 1865 and 1870, nearly the entire adult male population was killed or died of disease. Indeed, the war was a catastrophe from which Paraguay emerged defeated, poverty stricken, and short of men and cattle. The country has never fully recovered.

## Climate

The average monthly temperatures for Asuncion are given below but the actual range of temperatures is much greater since the thermometer sometimes rises to over 38° C. (*100° F.*) in summer and drops to below 2° C. (*35° F.*) in winter. Rainfall, which falls mostly in summer, varies from about 60 in. east of the Paraguay to 36 in. in the west, which suffers from droughts:—

Asuncion

| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Temp. in ° C. | 27 | 27 | 26 | 22 | 19 | 18 | 18 | 19 | 21 | 23 | 25 | 27 |
| Temp. in ° *F.* | *80* | *81* | *79* | *72* | *67* | *64* | *65* | *66* | *70* | *73* | *77* | *80* |
| Rainfall in inches. | 6·7 | 5·7 | 5·2 | 5·1 | 4·0 | 2·6 | 2·2 | 1·9 | 3·1 | 5·4 | 6·1 | 6·1 |

## Surface Features

The southern and south-eastern boundaries of Paraguay are formed by the Pilcomayo and Parana Rivers. The Paraguay River, running southwards through the centre of the country, divides it into two very different regions:—

(*a*) East of the river lies broken, hilly country with marshy lowlands bordering the river. This is the most developed part of Paraguay.

(*b*) West of the Paraguay lies the extensive alluvial plain, the Gran Chaco, little known and difficult of access.

EASTERN PARAGUAY contains most of the population and nearly all the cultivated land. The chief money crops are cotton and tobacco. Good flavoured oranges grow wild and are also cultivated in some places. They are mostly consumed locally since transport to the distant coast is expensive. Food crops include maize, manioc, sugar, rice, and many vegetables. An important product of this area is yerba maté, or South American "tea". It is an evergreen shrub which grows wild in Eastern Paraguay and the adjacent parts of Brazil and Argentina (pp. 186, 202). It is also widely cultivated. Branches of leaves are cut and dried over fires in furnaces. Yerba maté is in great demand in Paraguay, Uruguay, and Argentina. Coffee is grown in the north-east.

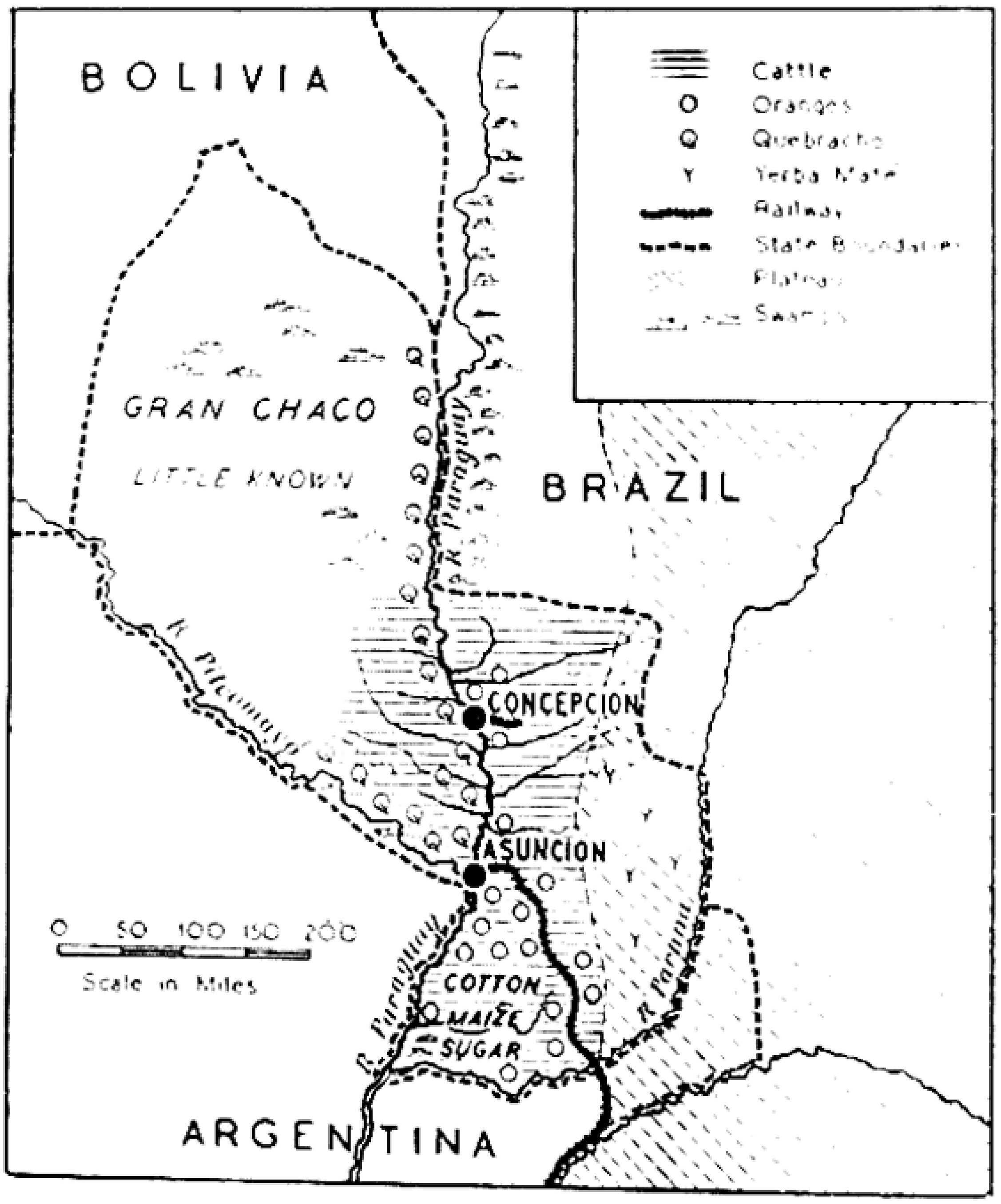


Fig. 44. PARAGUAY.

Cattle are reared throughout this area but, as in the campos of Brazil (p. 175), most of the animals are of low grade, suitable only for dried beef and hides.

THE GRAN CHACO, which lies west of the Paraguay, also stretches into Northern Argentina, Bolivia, and Brazil. It is subject to droughts and floods. Near the rivers are large tracts of swamp but much of the area is grassland which degenerates into the thickets of thorny scrub in the drier areas. Over much of the Gran Chaco water is scarce.

The sparse population of this region includes nomadic Indians and a few settlers who grow subsistence crops and keep cattle, but isolation, flood, and drought make the Gran Chaco unattractive to farmers. The most important product is probably the quebracho (axe-breaker) tree which grows on the lowlands by the Paraguay and the Pilcomayo. The hardwood is used for fencing posts but it is chiefly important for tannic acid of which it forms the world's chief source. The timber is felled and the logs are taken to factories where the acid is extracted.

### Outlets and Trade of Paraguay

Almost all the towns of Paraguay lie on or near the river, which is the country's chief outlet.

*Asuncion* (300,000), the capital, largest town and chief commercial centre, is a river port, connected by rail and river with Buenos Aires. But river navigation is difficult because of the shifting sand-banks and winding channels of the Paraguay. An airline from Buenos Aires to Rio de Janeiro by way of Asuncion connects the town with both Argentina and Brazil.

Paraguay has the smallest volume of trade of any South American country. This is largely because it is so inaccessible, and also because there are few minerals and there is little capital to develop industry. By far the greater part of her trade is with the U.S.A.; Argentina and Great Britain take second and third place respectively. The chief exports are meat products, timber, hides, quebraco extract, cotton, yerba maté, bananas, and tobacco. Foodstuffs, textiles, and machinery form the chief imports, including wheat from Argentina.

Paraguay is one of the world's under-populated areas, capable of development in the future as a food-producing country. But Paraguay is greatly influenced by her neighbours, especially Argentina which controls both rail and river outlets to the coast. Moreover, Argentina supplies essential foodstuffs and can readily exert pressure on Paraguay by threatening to reduce deliveries. The prosperity and future development of Paraguay must inevitably depend on close co-operation and friendship between the two countries.

# CHAPTER XII

## ARGENTINA AND URUGUAY

### ARGENTINA

Argentina—the second largest country in South America—is nearly two-fifths the size of Australia. It stretches from latitude 55° S. to a little north of the Tropic of Capricorn. Unlike Brazil, Argentina was of little importance in colonial days but, since the latter part of the nineteenth century, it has developed into the leading commercial nation of South America. Argentina is predominantly a white man's country; 98 per cent. of the 22 million people are of unmixed European stock, mainly descendants of Spanish and Italian immigrants who entered the country after 1850. There are also descendants of the original Spanish colonists. Other white elements include German and Polish immigrants and a few settlers of Scottish and Welsh extraction, who have sheep farms in Patagonia. About 2 per cent. of the population are mestizos. Indian and negro elements of the population are negligible. Although Argentina is a farming country, nearly two-thirds of the people live in towns, nearly one-fifth of the entire population in the capital city of Buenos Aires. Much of the countryside is sparsely peopled, the density per square mile varying from less than one in Patagonia to over twenty-five in the area round Buenos Aires.

### Surface Features

The western boundary of Argentina is formed by the eastern slopes of the Andes, which give rise to a narrow belt of dissected mountainous country. The greater part of the surface, however, is lowland, relieved by few hills or watercourses. The main rivers are those which flow into the Plate estuary and several rivers which flow eastward across Patagonia.

### Climate and Natural Regions

Argentina stretches through about 30° of latitude and therefore experiences a variety of climates. Mean annual temperatures decrease from over 21° C. (*70° F.*) in the north to about 6° C. (*42° F.*) in the south, while rainfall decreases towards the south and west. More climatic details will be given when studying the natural regions into which Argentina may be divided. On a broad basis five such regions may be distinguished (Fig. 45).

(*a*) The Pampas.
(*b*) The Arid West.
(*c*) Mesopotamia.
(*d*) Gran Chaco.
(*e*) Patagonia.

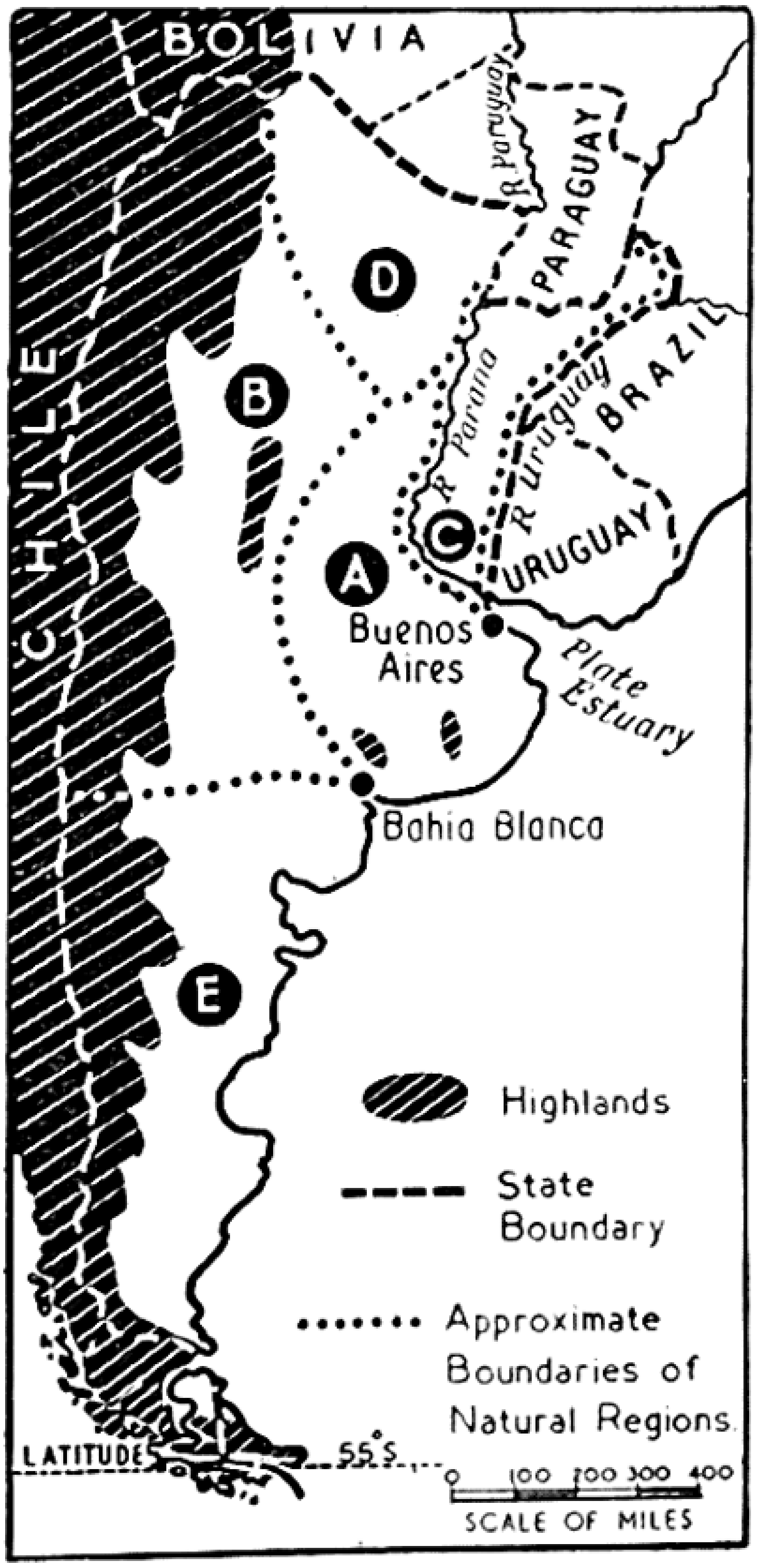


Fig. 45. Natural Regions of Argentina.
A. The Pampas.
B. The Arid West.
C. Argentine Mesopotamia.
D. Gran Chaco.
E. Patagonia.

## The Pampas

Surface Features. The most important part of Argentina is a level, grassy plain some 250,000 square miles in extent, known as the pampas. It is covered with fine grained, stoneless deposits similar to loess which in some places exceed 900 ft in thickness. For long ages, winds have carried dust from the dry west and deposited it in the pampas until it has buried deeply the original landscape, except where it emerges to form low hills south of Buenos Aires. Indeed, these hills are the only source of hard rock anywhere in the pampas. To the north-east, the lower courses of the Parana and Uruguay form important waterways. Elsewhere, there is little surface water but underground water is easily obtainable in wells. Wind pumps, which raise the water to the surface are typical features of the landscape.

CLIMATE AND NATURAL VEGETATION. The pampas region has a temperate climate which allows outdoor field work throughout the year. Winters are mild, although frosts may occur; the average number of frost-free days varying from 300 in the north to 140 in the south. Summers are hot, but not unpleasant. Indeed, temperature conditions in the pampas make it very suitable for white settlement. Rainfall decreases to the south and west but, except on the inland fringes, it is everywhere adequate and reliable. Annual amounts vary from 40 in. in the east to about 20 in. in the south and west. Most rain falls in summer, but there is no winter drought. The average monthly temperature and rainfall figures for Buenos Aires are:—

BUENOS AIRES

| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Temp. in °C. | 23 | 23 | 21 | 17 | 13 | 11 | 10 | 11 | 14 | 16 | 19 | 22 |
| Temp. in °*F.* | *74* | *73* | *70* | *62* | *56* | *51* | *50* | *52* | *57* | *61* | *67* | *71* |
| Rainfall in inches. | 3·0 | 2·5 | 4·6 | 3·0 | 2·8 | 2·7 | 2·2 | 2·4 | 3·0 | 3·6 | 2·8 | 2·9 |

Originally the pampas region was a vast grass-covered plain with clumps of tall, plumed grasses unrelieved by tree growth.

PASTORAL OCCUPATIONS. With so many advantages—natural grassland, mild climate, and adequate water supply, it is not surprising that the early Spanish colonists reared cattle on the pampas. The herds fed on open ranges tended by gauchos or ranch hands who lived half their days on horseback and whose principal food was beef. However, the cattle were lank and bony, and only fit to produce hides and dried meat. Cattle rearing is still the main occupation of the pampas, but the whole aspect of the industry has changed and first-class meat is now the chief product. The change which came about towards the close of the nineteenth century was brought about by the factors outlined below:—

(i) Importation of pure-bred European beef cattle.
(ii) Introduction of wire fencing.
(iii) Introduction of European grasses and alfalfa for fodder.
(iv) Construction of railways.
(v) Invention of refrigerator ships.

The importation of pure-bred stock from Europe lies at the base of the modern Argentine cattle industry. The careful breeding of these animals necessitated the division of the ranges into fields. An enormous length of fencing was needed and this was only made practicable by the use of wire held in place by stumps of hard durable quebracho wood which grows in the Gran Chaco (Fig. 45).

Better breeds of cattle needed better fodder than that provided by the coarse native grasses. European grasses were introduced but the fodder which has revolutionised the cattle industry is alfalfa, a leguminous plant highly suited to pampas conditions in the following ways:—

(*a*) Beef cattle fatten more quickly on alfalfa than on native grasses and require a smaller acreage of fodder.
(*b*) One planting of alfalfa yields crops for about ten years.
(*c*) Alfalfa has very deep roots which penetrate the underground water supply and therefore it remains green when other fodder tends to dry up in the late summer.
(*d*) As a leguminous plant, it has the power to fix the nitrogen of the air in the soil and so fertilises the ground in which it grows.

Alfalfa accounts for about one-quarter of the crop land of the pampas and is the chief cattle fodder except in the area south of Buenos Aires (Fig. 45) where the soil is unsuitable.

Railway construction began in 1857 and there is now a network of railways radiating from Buenos Aires and serving all parts of the pampas. The heavy beef cattle cannot be driven so far as native varieties, so that the building of railways made it possible to transport the fat animals from the estancias (farms) to the frigoricos (meat-packing plants) situated on the Parana and Plate estuary.

These frigoricos are well equipped with modern machinery and great attention is paid to cleanliness and high quality. Every part of the animal is used. The carcase becomes chilled and frozen beef, and tinned meat. Bones are exported for use in pottery making and are also ground to make fertilisers. Hides, fats, fertiliser from blood and offal, and medical vaccines from glands, are other products. The export of meat was made possible by the first refrigerator ship which visited the Plate estuary in 1877. Since then, ports have been equipped with modern machinery for handling the meat. Unfortunately, severe droughts in 1962 and 1963 depleted the great herds of beef cattle and exports of meat declined.

Sheep are reared on the pampas, principally for mutton. A few pigs are reared in the corn lands but they require too much labour and are too often attacked by disease to be popular at present.

Dairy farming is increasing in the area round Buenos Aires (Fig. 45) where it supplies the needs of a large urban population. Argentina exports dairy produce to Great Britain.

AGRICULTURE. Grazing industries have been accompanied by a rise in agriculture. Although only about half the pampas is cultivated, about two-thirds of the exports of Argentina come from ploughed lands. Wheat, alfalfa, maize, flax, and other oil seeds are the chief products.

*Wheat.*—The chief wheat lands form a crescent which extends from Santa Fé to Bahia Blanca (Fig. 46). The main wheat belt is limited in the west by the 20-in. isoyhet, though it can be cultivated with as little as 16 in. of rain, but crops are then precarious. To the north, rainfall conditions are unsatisfactory since there is too much rain in summer and too little in winter. The area to the east, between Buenos Aires and Bahia Blanca, is poorly drained and not favourable to wheat (Fig. 46). The seed is sown in May-August and harvesting begins in November. Most of the operations are mechanised. When cut, the wheat is threshed immediately, put into jute bags and hauled to the nearest railway station for transport to the ports. About 60 per cent. of the crop is exported. Wheat growing is usually associated with ranching and the cultivation of alfalfa, barley, and green fodders. The

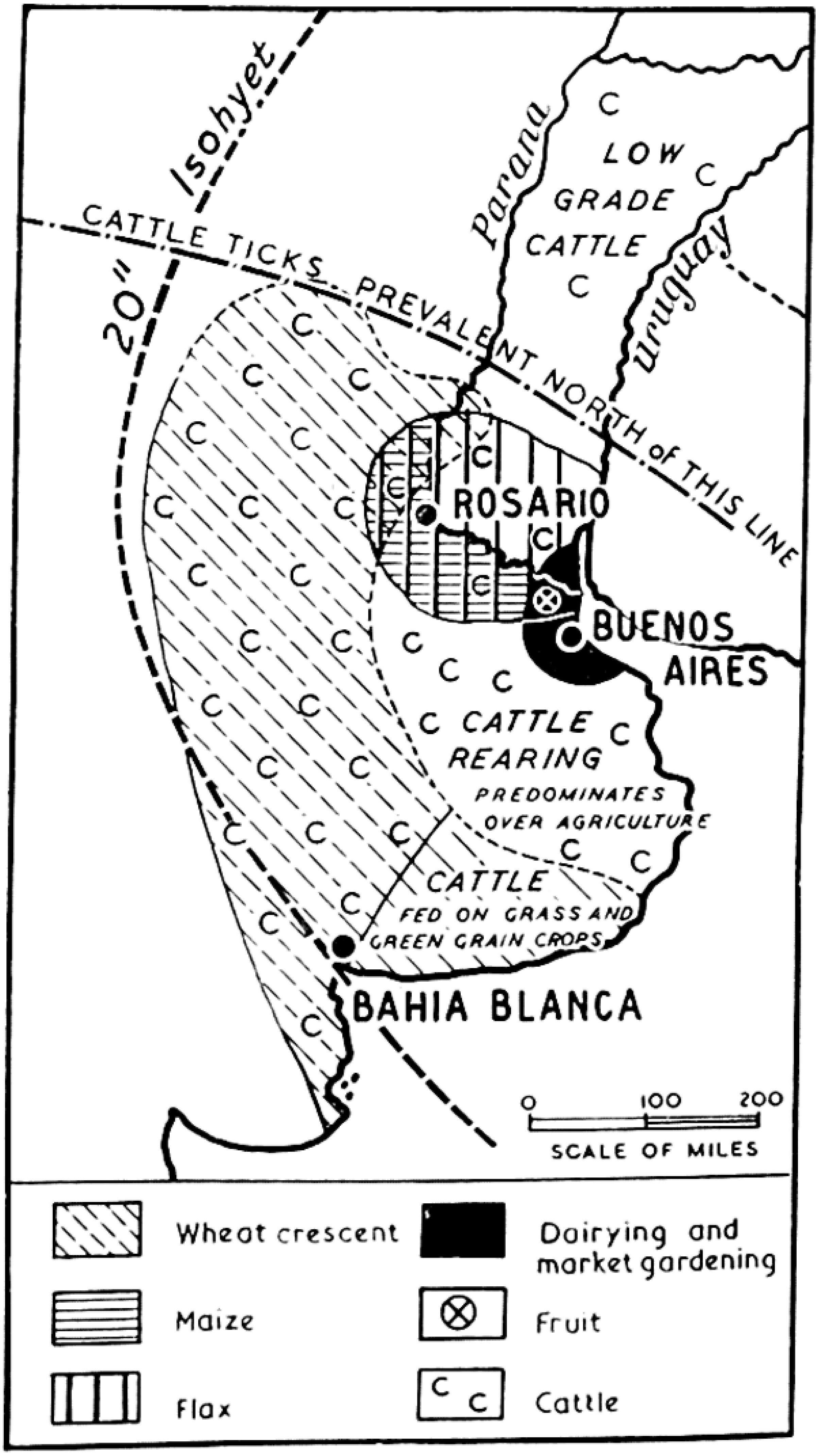
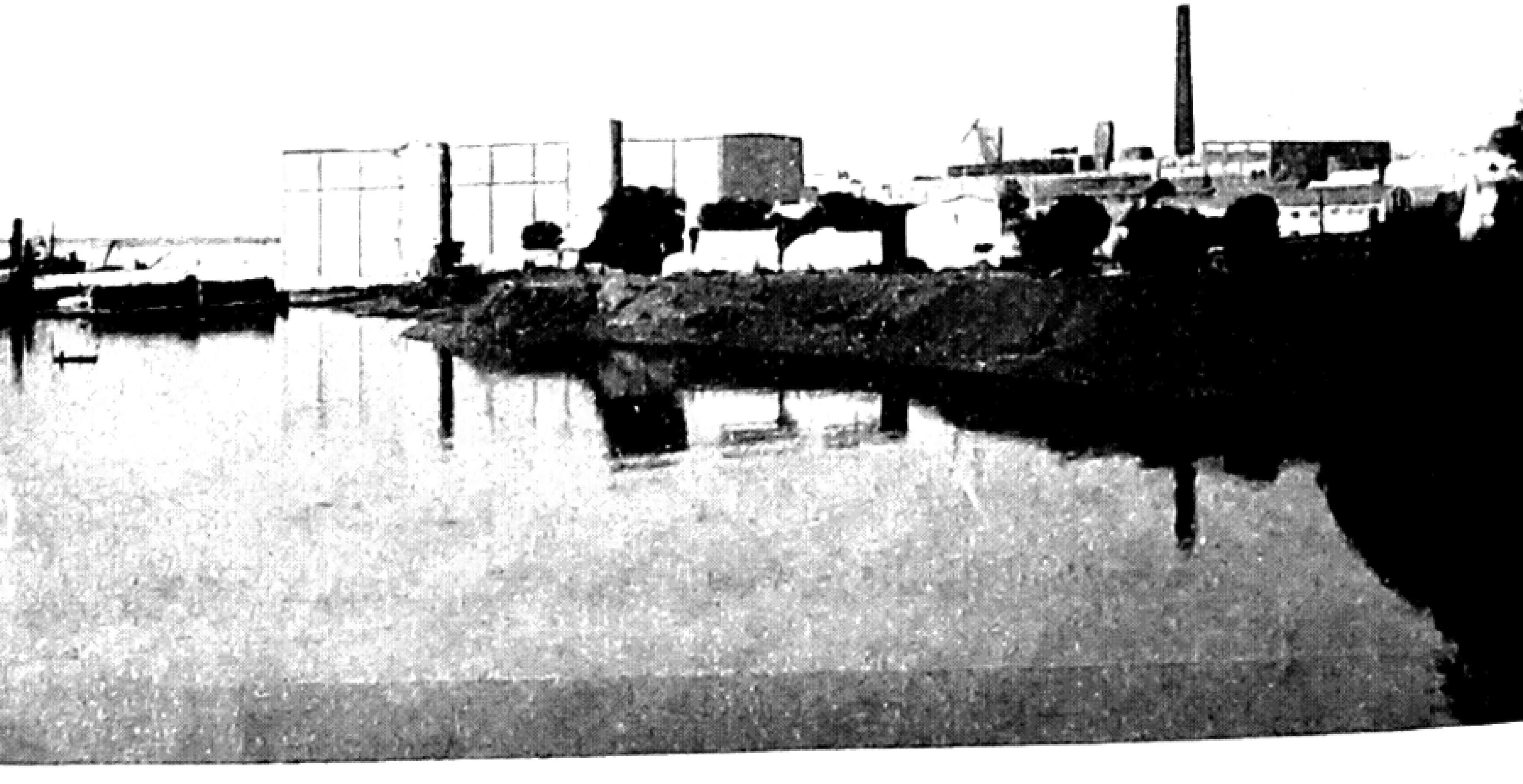

20" Isohyet
CATTLE TICKS PREVALENT NORTH of THIS LINE
Parana
Uruguay
LOW GRADE CATTLE
ROSARIO
BUENOS AIRES
CATTLE REARING PREDOMINATES OVER AGRICULTURE
CATTLE FED ON GRASS AND GREEN GRAIN CROPS
BAHIA BLANCA
0
100
200
SCALE OF MILES
Wheat crescent
Maize
Flax
Dairying and market gardening
Fruit
Cattle

Fig. 46. ARGENTINA: THE PAMPAS.

*Above*: ANDEAN MOUNTAIN LAKE NEAR ARGENTINE-CHILE BORDER. (*Aerolineas Argentinas.*)
*Below*: A TUNNEL ON THE TRANS-ANDEAN RAILWAY. (*Exclusive News Agency.*)



*Above:* AN ARGENTINE STOCKYARD. LASSOOING A CALF FOR BRANDING. *(Picture Post.)*
*Below:* URUGUAY. THE FRAY BENTOS REFRIGERATION PLANT ON THE RIO NEGRO.
*(Exclusive News Agency.)*

pampas is very favourably situated for the export of wheat since no part of the wheat crescent lies more than 400 miles from the coast, and it is served by a network of railways.

*Maize.*—Maize requires a greater summer heat and rainfall than wheat. It is widely cultivated in a belt centred on Rosario. To the south it encroaches on the wheat belt. Unlike the United States, Argentina exports about 55 per cent. of the crop. In 1963-4 the United States produced over twenty times as much maize as Argentina but consumed most of it in her cattle feeding, whereas Argentina, whose cattle are fattened on alfalfa, ranked as the world's largest exporter of maize. Although maize is the main crop of the maize belt, the estancias also keep cattle and grow alfalfa and other crops such as wheat and flax.

*Flax* is grown on the pampas mainly for its oil—linseed oil. Although it is grown in the maize belt of the pampas the chief producing area lies in Argentine Mesopotamia. Production has decreased in recent years.

*Fruit* is grown near Buenos Aires (Fig. 46) for local consumption. Varieties include apples, pears, cherries, peaches, and apricots. There are also many market gardens which supply salads and fresh vegetables to the urban areas. Many are located in the same area as that important for dairy farms.

Some of the estancias of the pampas are very large, often over 100,000 acres, and are owned by rich men who live in Buenos Aires and are interested primarily in cattle. Formerly, most of the pampas region was divided into big estancias but a change is taking place. Many estates have been subdivided into farms of 400-1,000 acres and let to tenant farmers. It is estimated that tenant farmers account for four-fifths of the agricultural production of the pampas. Poorer immigrants may contract to farm perhaps 500 acres of a big estancia. The landlord provides machinery, seed, and land, and the contractor shares the sale of his crops with his landlord. Such share-croppers frequently move on, but it is customary for them to leave the land planted with alfalfa thus increasing the fodder resources of the landlord. There are also small landowners in the northern part of the wheat crescent. They consist chiefly of Swiss, French, and Italian settlers, who account for most of the wheat grown in the northern part of this area.

TOWNS. The most important towns of the pampas are ports. *Buenos Aires*, the capital and the seventh largest city in the world, has a population of over 3,875,000 and contains nearly one-fifth of all the people of Argentina. It is the focal centre of the political, cultural, and commercial, life of the nation, and is still growing rapidly. It owes its site to a small river which formed the only favourable position for a port along a mud-fringed shore. At great expense channels were dredged and eventually a large modern port grew up, an instance of man's conquest over unfavourable natural conditions. The railways of Argentina focus on Buenos Aires which deals with the greater part of the exports and imports of the country. It is also an industrial town producing over 40 per cent. of the manufactured goods of Argentina. A great variety of goods, such as textiles, meat products, flour, boots and shoes, and tobacco are produced.

*La Plata* (358,000), a modern port situated 34 miles from Buenos Aires, has important meat-packing plants.

*Rosario* (720,000), the second largest city and port in Argentina, is situated 200 miles upstream from Buenos Aires. Several lines of railway link the town with the surrounding country and there are direct connections to Buenos Aires and Bahia Blanca. Ocean-going vessels can reach the port which chiefly deals with the export of wheat, maize, and flax seed. The town also has a large meat-packing industry.

*San Nicolas*, on the southern bank of the Parana between Buenos Aires and Rosario, has important steel mills.

*Bahia Blanca*, the third port of Argentina, serves the southern pampas. It is a modern well-equipped port, chiefly dealing with wheat export. A trans-Andine railway is now being built to link Bahia Blanca with Concepcion in Chile.

All these towns are either on the coast or on the Parana. Away from the river the pampas has very few towns; its settlements are rural rather than urban. Such towns as do exist are centres which serve the needs of the surrounding countryside.

## The Arid West

This is a belt of country in north-western Argentina stretching from the foothills of the Andes to the western edge of the Chaco (Fig. 45). The surface consists of dissected plateaux and depressions broken up by mountain spurs, and isolated patches of hilly country. Rivers rise in the mountains and form alluvial cones where they emerge on to the lower land. The alluvial soils are porous, and the rivers usually sink beneath the ground so that there is very little surface water in much of the area. Water is provided for irrigation by damming the streams before they sink into the ground.

CLIMATE. Rainfall is very low in the Arid West. In the north, near Tucuman, the average annual rainfall of 38 in. is sufficient to grow some crops without irrigation, but in the south, near Mendoza, the annual rainfall of 8 in. makes irrigation a necessity.

NATURAL VEGETATION. Much of the area is covered by a sparse growth of drought-resisting scrub, with many varieties of cactus and thorn bush, which affords a scant pasturage for sheep and goats.

AGRICULTURAL PRODUCTS. The floors of the valleys and the alluvial cones form important agricultural areas. Since the Arid West stretches through more than 10° of latitude, and rainfall diminishes southward, three areas which differ in the agricultural economy may be recognised:—

| | CHIEF AREA IN DISTRICT | AVERAGE ANNUAL RANGE OF TEMPERATURE | AVERAGE ANNUAL RAINFALL | CHIEF PRODUCTS |
|---|---|---|---|---|
| (*a*) North | Tucuman | 12°—25° C.<br>*53°—77° F.* | 38" | Sugar-cane |
| (*b*) Centre | Cordoba | 9°—23° C.<br>*49°—74° F.* | 28" | Fruit, vegetables, alfalfa |
| (*c*) South | Mendoza | 7°—24° C.<br>*45°—74½° F.* | 8" | Vines |

(*a*) The extreme north-west of the Arid West is the chief sugar-producing area of Argentina, 80 per cent. of which is produced in the district near *Tucuman*, which has a population of 290,000. There are many crushing mills and refineries, and a network of railways brings the cane to the mills. Many people are required in the sugar industry and the density of rural population is here higher than anywhere else in Argentina.

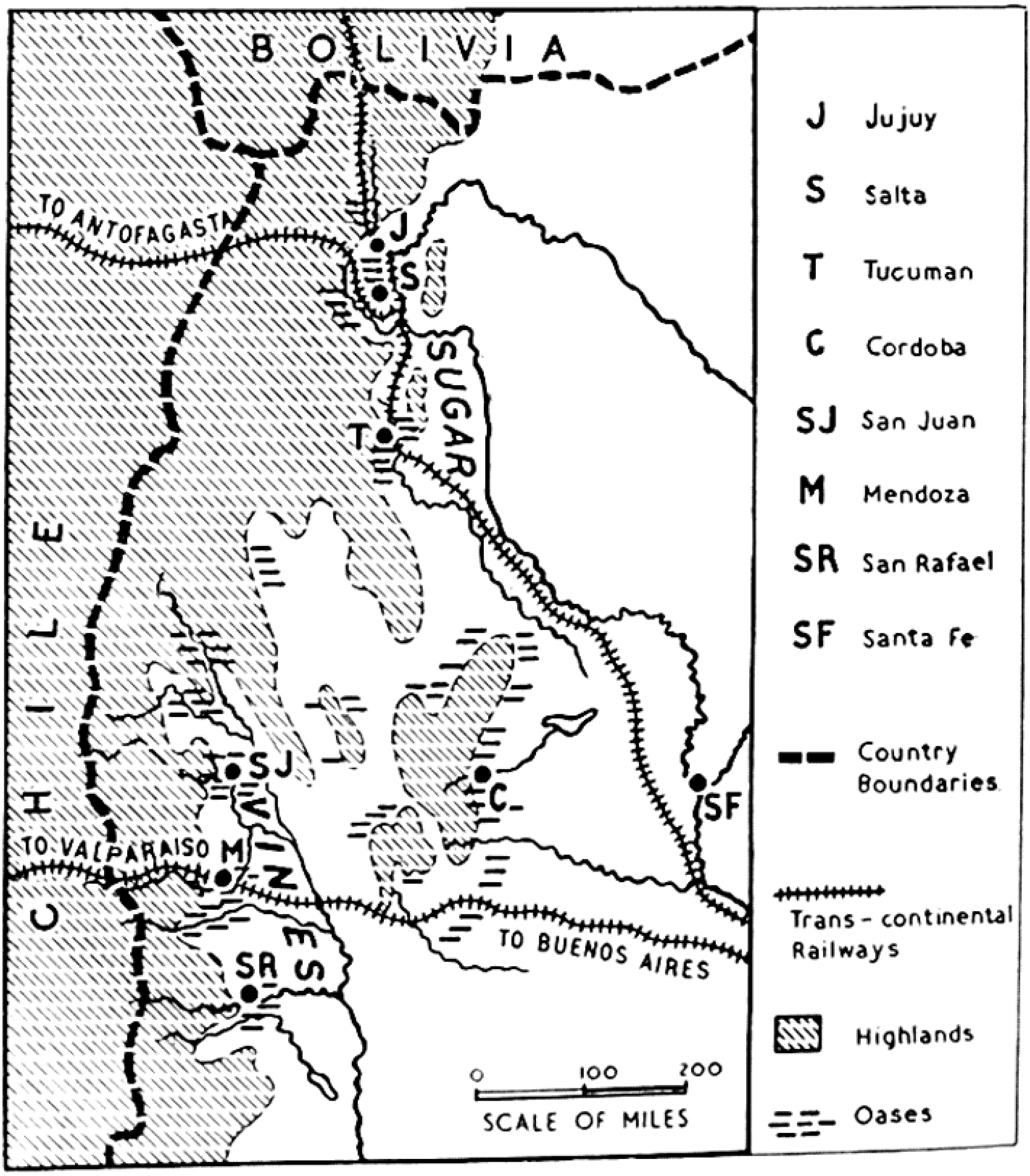


Fig. 47. The Arid West of Argentina.

Round Salta and Jujuy, maize is the chief crop, but cultivation of sugar-cane is increasing. High temperatures and abundant sunshine favour sugar-cane cultivation, but the area is also handicapped by drought and frost. Maize, rice, fruits, and vegetables, are grown for food.

(*b*) The Cordoba district is a transitional area between the sugar plantations of the north and the vineyards of the south. Streams provide water for orchards, vineyards, and fields of alfalfa, as well as for subsistence crops. Wine and alfalfa are the chief money products.

*Cordoba* is an important centre with 635,000 people.

(*c*) To the south, the three large oases of Mendoza, San Juan, and San Rafael, produce large quantities of grapes. Rows of vines, supported by wires, separated by straight irrigation trenches lined by poplars, and intersected by dusty roads, are characteristic features of the landscape. Occasionally vivid green patches betoken fields of alfalfa, which is used to fatten cattle reared on the mountain pastures where the rainfall is higher. Orchards of apricots, peaches, plums, and pears, are also maintained by irrigation. Big factories, or *bodegas*, buy the grapes from the growers and produce wine which is drunk in many parts of Argentina. Olive oil is produced from plantations of olives.

*Mendoza* (170,000), the chief town, is situated at the eastern approach to the Uspallata Pass and through it passes the trans-continental railway connecting Buenos Aires with Valparaiso in Central Chile.

MINERALS. Petroleum occurs along the foot of the Andes and is worked near Salta, Mendoza, and Neuquen. Production is increasing. Low-grade lignite is also worked near San Juan. Deposits of copper, tin, silver, manganese, iron, and lead, are known to exist but mining is not important. A small steel industry at Zapla, near the source of iron ore, produces pig iron and steel ignots.

The Arid West was the most important part of Argentina in colonial days, since its fertile oases provided food and settlement on the route from the east coast to Bolivia. In those days, the minerals of the Andes were the most important products sought by the Spaniards who cared little for the farming possibilities of the pampas. The earliest settlements in Argentina grew up in the Arid West: Mendoza was founded in 1561, San Juan in 1562, and Tucuman in 1565.

### Argentine Mesopotamia

The country between the Rivers Parana and Uruguay is known as Argentine Mesopotamia. This is a land of abundant rainfall, with high summer temperatures. It is a land of rolling, grassy plains rising in the east to forested plateau, and sinking to marshy lowlands in the river valleys. In its physical setting it resembles Eastern Paraguay (p. 188). Where the Parana and the Uruguay leave the plateau, the Iguaza and Guayra Falls rival the Victoria Falls of the Zambezi in splendour. The chief industry is cattle-grazing but the southern part has become one of the chief sheep-raising areas of Argentina and provides an important source of its wool exports. Agriculture has also spread in the south where much flax and maize are grown. Southern Mesopotamia is the leading flax-growing area in Argentina. Grapefruit growing is expanding in Corrientes and Entre Rios. Yerba maté (p. 190) grows wild on the wooded plateau in the north and is cultivated particularly in the area round Posedas. There are no mineral developments and few important towns. *Posedas* and *Corrientes* are small river ports and State capitals.

### The Gran Chaco

The Gran Chaco resembles in relief and climate and natural vegetation the western half of Paraguay (p. 189), but it is more developed. As in Paraguay, quebracho is the chief natural product (p. 189). Cattle are raised on the grassy savannas. Cotton growing has become important in the north of the area and producing areas are closely linked by railways which connect with the northern oases of the Arid West. Cotton can be grown without irrigation where the annual rainfall exceeds 30 in., but the area is liable to droughts which may be disastrous. Food crops include maize and manioc. In the southern part, where the Chaco merges with the pampas, large estates produce beef cattle of good quality. *Resistencia*, a river town on the Paraguay, is the chief centre of the new agricultural settlement of the northern Chaco.

### Patagonia

Argentine Patagonia stretches from a little north of the Rio Negro to Tierra del Fuego—through about 16° of latitude. It offers a great contrast to the rest of the Republic

RELIEF. Much of Patagonia consists of plateaux which form a cliff-fringed coast except near mouths of rivers. Inland, they rise in a series of steps which reach over 5,000 ft in altitude in the west. Isolated areas of irregular, hilly country rise above the general level surface of the plateaux, while deep gorges are cut by eastward flowing rivers. To the west rise the snow-capped Andes. Glaciers descend into the upper parts of the valleys, and numerous lakes bear evidence of more extensive glaciation in the past. The plateaux are divided from the Andes by a series of basins which form a long N.-S. depression. This area is one of the most fertile and beautiful parts of Patagonia.

CLIMATE. Patagonia has an unattractive climate. Summer temperatures range from 21° C. (*70° F.*) in the deep, sheltered northern valleys to below 13° C. (*55° F.*) in the south and on the plateaux. Winters are very unpleasant everywhere and bitterly cold in the south, although the average temperature of the coldest month nowhere falls below 0° C. (*32° F.*) except on the high mountains. Violent winds sweep over the countryside at all seasons and often produce dust storms. Off the south coast of Tierra del Fuego, and in the Magellan Strait, strong winds and sea fogs make conditions very dangerous for shipping.

No part of Southern Argentina receives much rain except on the slopes of the Andes (60 in.) and in Tierra del Fuego (50 in.) where depressions cause much cloud and drizzle. Most of Patagonia is a desert with annual rainfall varying from 5 in. to 8 in. Snow covers much of the country in winter.

NATURAL VEGETATION. The dry plateaux are often covered with broken rocks and support a poor cover of bunch grass and scrub. The grass improves towards the south where the rainfall is greater and in the depression at the foot of the Andes. Forests are limited to the rainier slopes of the Andes where pines and evergreen beeches are characteristic, but inaccessibility makes these forests of little economic value.

FARMING. Patagonia is sparsely populated with less than one person per square mile. Much of the country is unsuitable and unattractive for human settlement. The most favourable parts are the valleys and depressions where the few farms are situated. Sheep farming is the chief occupation. Patagonia has one-quarter of the sheep of Argentina and supplies half of its wool export. The wool of the sheep grazed in the drier parts of the plateau is of inferior quality since it is frequently tangled with burrs and full of dust. The chief sheep areas are in the state of Santa Cruz, where better pastures produce half the total for Argentine Patagonia. Since pastures on the plateau are poor, large areas are required and ranches of thousands of square miles are common. In general, the sheep reared on the northern plateau are akin to merino sheep and chiefly produce wool, while those reared in the south are breeds which yield good mutton. Freezing plants have been built at coastal ports and frozen mutton is the chief export from this area. The Andean Depression with its better pasturage rears cattle as well as sheep.

There is very little cultivation except on a small scale near the scattered farms and in the Negro and Chubut Valleys. Large scale irrigation works on the Rio Negro have produced an irrigated oasis where wheat, fruit, and alfalfa are grown. This is the chief pear-growing area of Argentina. Fruit and alfalfa are also grown in the Chubut Valley in areas developed by Welsh settlers. Farms are situated in the valleys, where there is protection from the adverse climate, and where a water supply from rivers and wells is possible.

MINERALS. Petroleum is the chief mineral product. The largest oilfield in Argentina lies near Comodoro Rivadavia on the east coast of Patagonia. Its output is increasing and Argentina now produces enough oil for her own needs. A pipeline, over 1,000 miles long, takes natural gas from the oilfield to Buenos Aires.

Coal is known to occur in the north-west and in Patagonia but is little worked since it is difficult of access.

### Trade and Foreign Relations of Argentina

Britain and Argentina have been closely connected since the beginning of the nineteenth century when the newly formed Republic needed manufactured goods, such as textiles and metal goods, which Britain could supply. At this period, a number of British merchants and craftsmen emigrated to Argentina, thereby contributing money and skill to the early development. On the other hand, Britain needed Argentina's chief produce—meat, and trade between the two countries developed. British pure-bred cattle were imported to improve the Argentine herds. By the end of the nineteenth century much British money was invested in Argentina and railways were built with British capital. The people of Argentina held Britain in high regard. However, during the two world wars trade was disrupted and Argentina was forced to develop her own manufactures since many foreign supplies were cut off. As a result Argentina needed fewer manufactured goods, such as textiles, which Britain could supply, and more goods such as coal, steel, and industrial equipment which were in short supply in Britain in the post-war years. Britain had, therefore, fewer goods with which to buy Argentine meat. In order to provide ready money for purchases, it was necessary to sell to Argentina the railways and some other undertakings which were British-owned. In the meantime, with the rise of her industries 85 per cent. of all Argentine meat is now consumed within the country. At the same time, the production of both meat and wheat has declined. Britain has, therefore, been unable to obtain as much meat as formerly. Nevertheless, the needs of both countries are complementary and most Argentine people still regard the close co-operation of Britain and Argentina as essential to the economic prosperity of both countries. Britain, Holland, and the U.S.A. are the leading purchasers of Argentine exports, and the U.S.A., Western Germany, and Venezuela the chief suppliers of imports.

Argentina is one of the world's leading exporters of cereals, meat, oil seeds, and wool. The principal exports in 1963 (in millions of U.S. dollars) were:—

| | |
|---|---|
| Meat .. .. .. .. | 334 |
| Cereals and linseed .. .. | 281 |
| Wool .. .. .. .. | 161 |
| Oil seeds and oil .. .. | 129 |
| Hides .. .. .. | 78 |

The chief imports are machinery and vehicles, fuels and lubricants, iron and steel goods, chemicals, timber products, and textiles.

## URUGUAY

Uruguay is the smallest Republic in South America, little over half the size of the British Isles, yet it is one of the most prosperous. It lies on the north side of the Plate Estuary, east of the Uruguay River, a country of rolling plains, mainly underlain by igneous rock which weathers to a very fertile soil. The three million people are predominantly white, largely of Spanish and Italian descent. There are some mestizos, particularly in the north, but the number of Indians and negroes is negligible.

### Climate and Vegetation

The climate is pleasant, with no extremes. Winters are mild; the average temperature of the coldest month rarely falls below 10° C. (*50° F.*). The average temperature of the warmest summer month is about 22° C. (*72° F.*). Rainfall is evenly distributed throughout the year and varies from 36 in. in the south to 50 in. in the north. Droughts sometimes occur but are not common.

The vegetation of Uruguay is predominantly grass. The natural prairie grass, dotted with blue and purple flowers, which gave it the name of "The Purple Land", has largely been replaced by nutritious cultivated grasses. Forests are few and largely confined to river valleys.

### Occupations and Products

Uruguay is essentially a pastoral country. The rich grasslands, and the mild winters, make it possible for animals to be pastured out of doors all the year round.

Many good breeds of sheep are reared, mainly for wool, which is the chief export of the country. Uruguay produces nearly half the wool exported from the whole of South America. In recent years there has been a considerable increase in the number of sheep.

Fine high-grade beef cattle are fed on fenced pastures. Uruguay is now second only to Argentina in beef exports. Large meat-packing plants and good road and rail services have contributed greatly to the development of the industry. Hides and fats are also important exports. Dairy cattle are becoming increasingly important to supply the needs of the larger towns.

The growing of farm crops has never attracted many farmers in Uruguay, although the country is very suitable for arable farming. There is, however, an agricultural belt in the south, largely developed by more recent immigrants. Four chief crops are grown—wheat, flax, oats, and barley. Of these, flax is the only one which produces an export product—linseed.

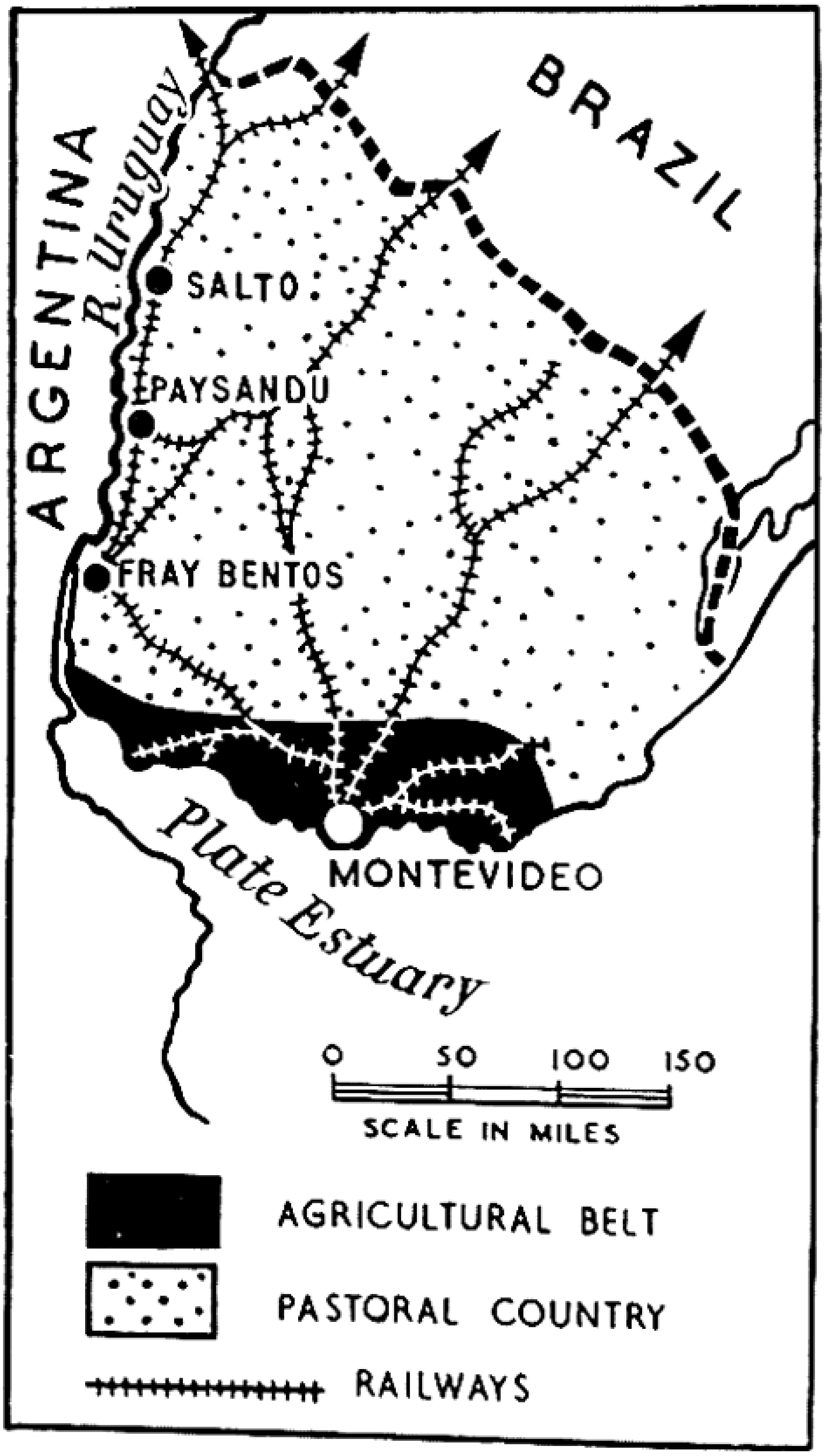


Fig. 48. URUGUAY.

Oats and barley are grown as fodder crops. Potatoes are also cultivated and market gardening is carried on near Montevideo. Wheat growing is encouraged by the Government in order to avoid heavy purchases from Argentina, but there seems to be no general tendency to follow the example of the Argentine pampas and extend cultivated areas on a large scale. This is partly due to the good grasslands, which make it unnecessary to plough up the ground for fodder crops like alfalfa. It is also due to the deep-rooted love of the Uruguayan farmer for pastoral farming.

### Manufactures and Towns

Since Uruguay has no minerals there are few manufactures. The principal industries are meat packing and the preparation of food products, textiles, and small consumer goods.

*Montevideo* (1,200,000), the capital, is by far the largest town and contains over one-third of the total population of the country. It is on the northern side of the Plate Estuary and vast sums have been spent to make it one of the most efficient harbours in the world. It is the focus of the railway system and the Government and cultural centre. Montevideo also handles over four-fifths of the exports and nearly all the imports of the country. It is a popular seaside resort much favoured by people from Buenos Aires, with magnificent hotels and casinos.

Other towns, which are much smaller, are chiefly meat-packing centres on the Uruguay River. *Paysandu*, the head of river navigation, *Salto*, and *Fray Bentos*, are the most important.

### Trade

Most of the exports of Uruguay are pastoral products—chilled and frozen meats, dried beef and beef extracts, corned beef and mutton, wool and hides. Imports are manufactured goods, coal, petroleum, and foodstuffs such as sugar and yerba maté. The chief customers are Britain, the U.S.A., the Netherlands, Italy, and Western Germany. Most of Uruguay's imports come from the U.S.A., Britain, Western Germany, and Brazil.

# CHAPTER XIII

## THE ANDEAN COUNTRIES: CHILE AND PERU

The Andean Countries of South America are Chile, Bolivia, Peru, Ecuador, and Colombia. North of Chile the Andes consist of high ranges enclosing intermont plateaux. Southwards from the latitude of Northern Chile the plateaux disappear and the Andes become a single mountain range.

## CHILE

Chile is a long, narrow country less than 250 miles wide, stretching for 2,630 miles, from latitude 18° S. to latitude 56° S., and with a population of just over 8½ million.

### Surface Features

The main surface features of Chile consist of three parallel strips of country which run from north to south—the Andes, the central valley, and the coastal ranges. South of latitude 40° S. subsidence has occurred; the mountains are lower, the central valley has become a sea channel, and the coastal ranges appear as numerous islands off the coast. North of latitude 40° S., the Andes are broken by a few passes, none lower than 10,000 ft. The most important of these is the Uspallata Pass through which road and railway connect Santiago with Buenos Aires. Lofty volcanic cones, some still active, form the highest peaks of the mountains. In the south, passes are lower and more numerous. Only in the extreme south does Chile extend east of the Andes where it reaches the east coast of South America on the northern shore of the Magellan Strait to include a small part of Patagonia.

Chile is afflicted by earthquakes which come at irregular intervals and cause great damage and suffering. In 1903 deaths numbered 3,000; in 1939 there were 40,000. The city of Concepcion has been destroyed by earthquakes five times. Valdivia was badly damaged in 1960.

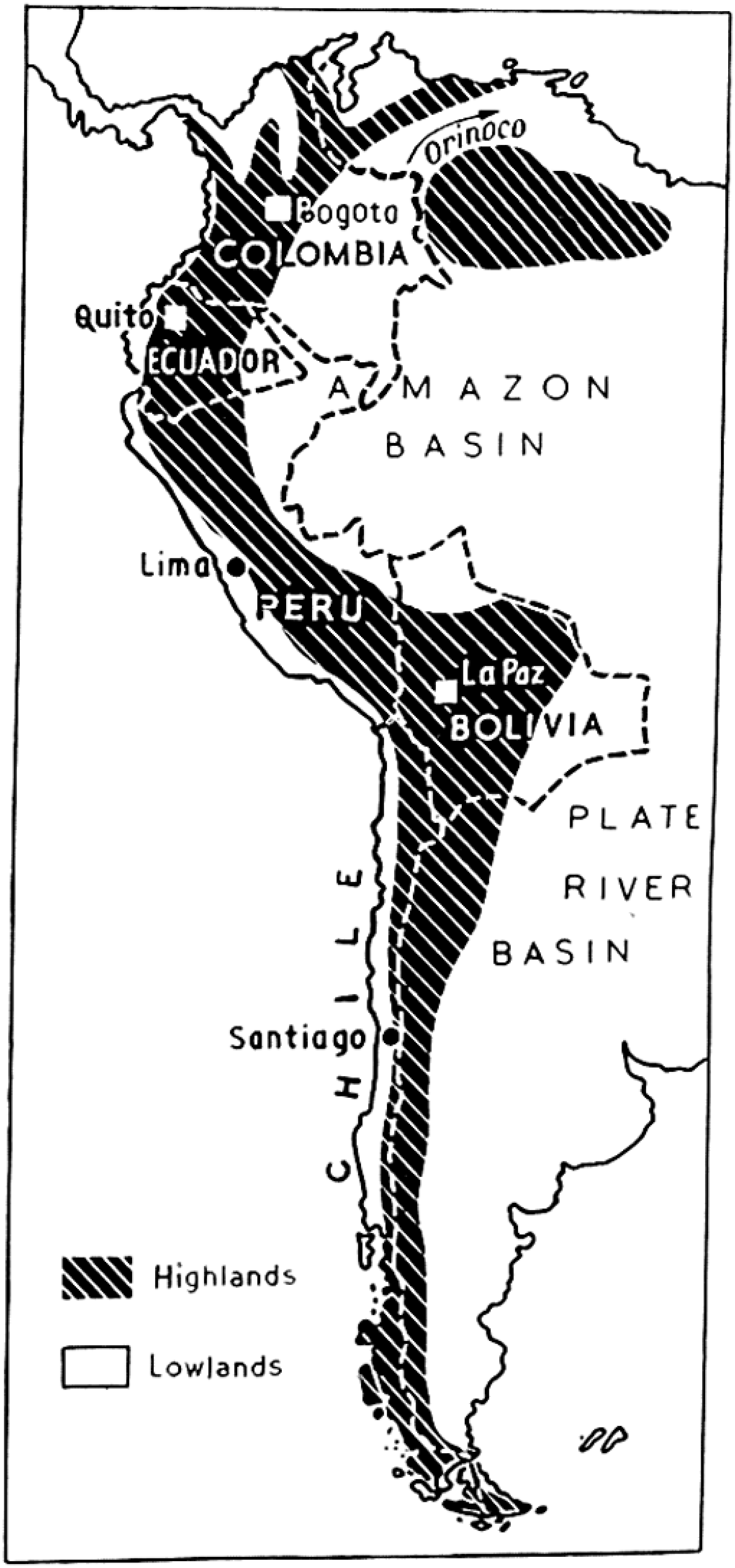


Fig. 49. Andean Countries.

## Climate

Since Chile extends through 30° of latitude, great contrasts in climate are experienced. In the north, the Atacama Desert is one of the driest regions in the world, while Southern Chile is one of the wettest. In general, it is possible to divide Chile into three natural regions which merge into one another:—

THE NATURAL REGIONS OF CHILE

| | | LATS APP. | CLIMATE | NATURAL VEGETATION | CHIEF PRODUCTS |
|---|---|---|---|---|---|
| (1) | *Northern Chile.* | 18° S.<br>30° S. | Desert. | Devoid of vegetation except on higher slopes of Andes, and where there are oases. | *Minerals:*<br>Copper, nitrates, iron. |
| (2) | *Middle Chile:*<br>(*a*) North Middle Chile. | 30° S.<br>38° S. | Mediterranean. | Evergreen scrub similar to maquis of Southern Europe. | *Agricultural Products:*<br>Maize, wheat, alfalfa, vines, cattle.<br>*Minerals:*<br>Coal. |
| | (*b*) South Middle Chile. | 38° S.<br>42° S. | Rain all the year. | Deciduous forests and grassland. | *Agricultural Products:*<br>Wheat, cattle, timber. |
| (3) | *Southern Chile:*<br>(*a*) Western Slope of the Andes. | 42° S.<br>56° S. | Heavy rainfall and much cloud all the year. | Dense evergreen forest. | Timber—little used except locally. |
| | (*b*) Chilean Patagonia East of Andes. | 52° S.<br>53° S. | Low rainfall spread through the year. Much cloud. | Poor grassland with trees on mountain slopes. | Wool and frozen mutton. |

## Northern Chile

Most of Northern Chile consists of the Atacama Desert. The steep, bare sides of the coastal range rise from the Pacific

Ocean, providing no good harbours. Numerous coastal ports, often built on raised marine terraces, offer no anchorage for large ships which must therefore anchor some two miles off shore. Goods and passengers are transported by small boats from the ports to the waiting ships and vice versa. Behind the coastal range is a depression known as the central

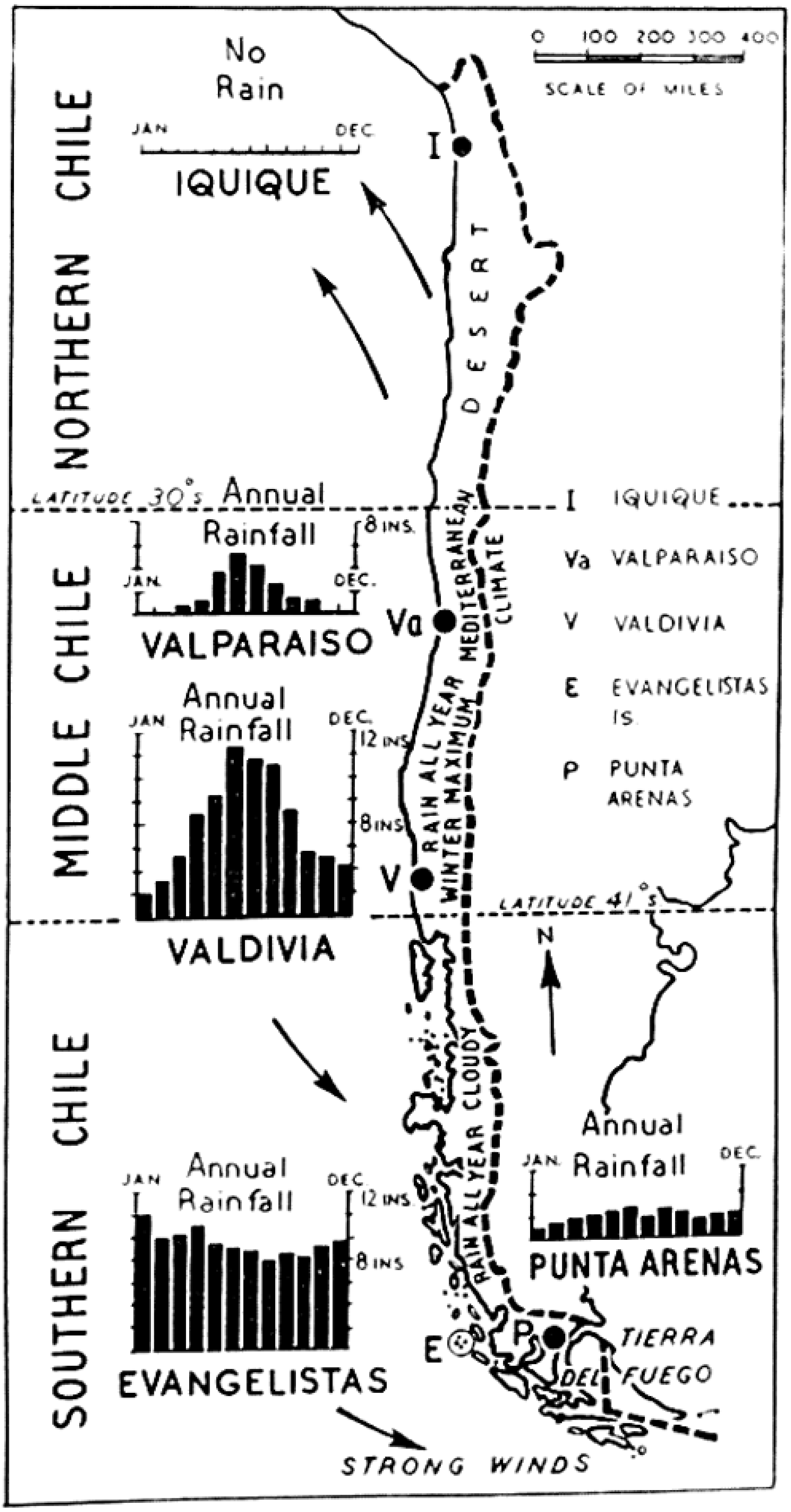


Fig. 50. Chile: Climatic Regions.

valley. The floor of the valley consists of a series of basins with floors often over 2,000 ft above sea level. This is one of the driest regions in the world; in some places no rainfall has ever been recorded. Streams which rise in the snow of the Andes usually sink into enormous gravel fans where they debouch from the mountains on to the valley floor. Indians obtain water from wells in these areas and live a secluded life growing a few crops and keeping a few goats, llamas, and sheep. Further west the valley is almost devoid of surface water. Only one stream, the Rio Loa, crosses the valley in the area north of the Tropic of Capricorn. Dried-up lake beds occur on the floor of the basins and these provide nitrates, one of the chief products of Northern Chile.

MINERALS. The dried-up lake deposits are known as *caliche* and consist largely of sodium nitrate and of salts of iodine. Since these are soluble in water they owe their preservation entirely to the dry climate. In the nineteenth century, sodium nitrate was found to be a valuable fertiliser and was used in the making of explosives, and economic development of the deposits was begun by British, American, German, and Chilean firms. Large *oficinas* or factories were built, water was piped from the Andes Mountains, and railways and ports were constructed. The prosperity of the industry varies with demand, which is always highest in time of war. Since the utilisation of atmospheric nitrogen for the manufacture of nitrates in European countries, America, and Japan, the Chilean nitrate industry has had to face competition, but the low cost of production in Chile has enabled it to hold its own in the world markets.

The caliche, which averages about 1 ft in thickness, is drilled from the lake beds and taken to the oficinas where the various products are separated and refined. (See opposite p. 228.) When purified, the sodium nitrate (Chile saltpetre) is bagged and transported to the coast for export. Iodine and potassium nitrate are important by-products.

Copper is the most important mineral in Northern Chile. It is mined by American firms in three localities in the Andes. Two of these, Potrerillos and Chuquicamata, are in North

Chile and the third at El Teniente is south of Santiago in Middle Chile. Copper accounts for nearly 60 per cent. of Chile's exports. The copper plants are all equipped with modern machinery for concentrating the ore and are served by railways which carry it to the coast. Iron occurs near Coquimbo and is being developed by an American steel company, which ships it to the north-eastern ports of the U.S.A. where it is smelted. Gold, silver, manganese, lead, and zinc, are obtained in small quantities.

A railway passes down the central valley of North Chile and has many branches connecting the oficinas and mines with the ports. Two railways, one from Arica and one from Antofagasta, pass into Bolivia and connect that inland country with the coast of Chile.

Although minerals make up the most valuable part of Chilean exports, relatively few workers are engaged in mineral production. They are concentrated near the mineral workings and in the numerous small ports on the coast. The rest of Northern Chile is extremely sparsely populated.

There are very few oases in the Chilean Desert, the most important lying in the valley of the Rio Loa. Only about 0·02 per cent. of Northern Chile is cultivated and the products help to feed the people engaged in mineral industries. Corn, alfalfa, and grapes are the chief crops.

The chief towns—*Arica*, *Iquique* (48,000), *Antofagasta* (75,000), *Coquimbo*—are small ports shipping minerals.

### Middle Chile

Middle Chile may be divided into two areas in which climate, vegetation, and agriculture differ:—

(*a*) North Middle Chile.
(*b*) South Middle Chile.

NORTH MIDDLE CHILE contains the capital, Santiago, and is the most densely populated part of the country and the centre of its cultural life. It has a Mediterranean climate with dry summers and mild, wet winters, and is a transition area between the desert of North Chile and the rainy districts to the south. The average monthly temperatures of Valparaiso

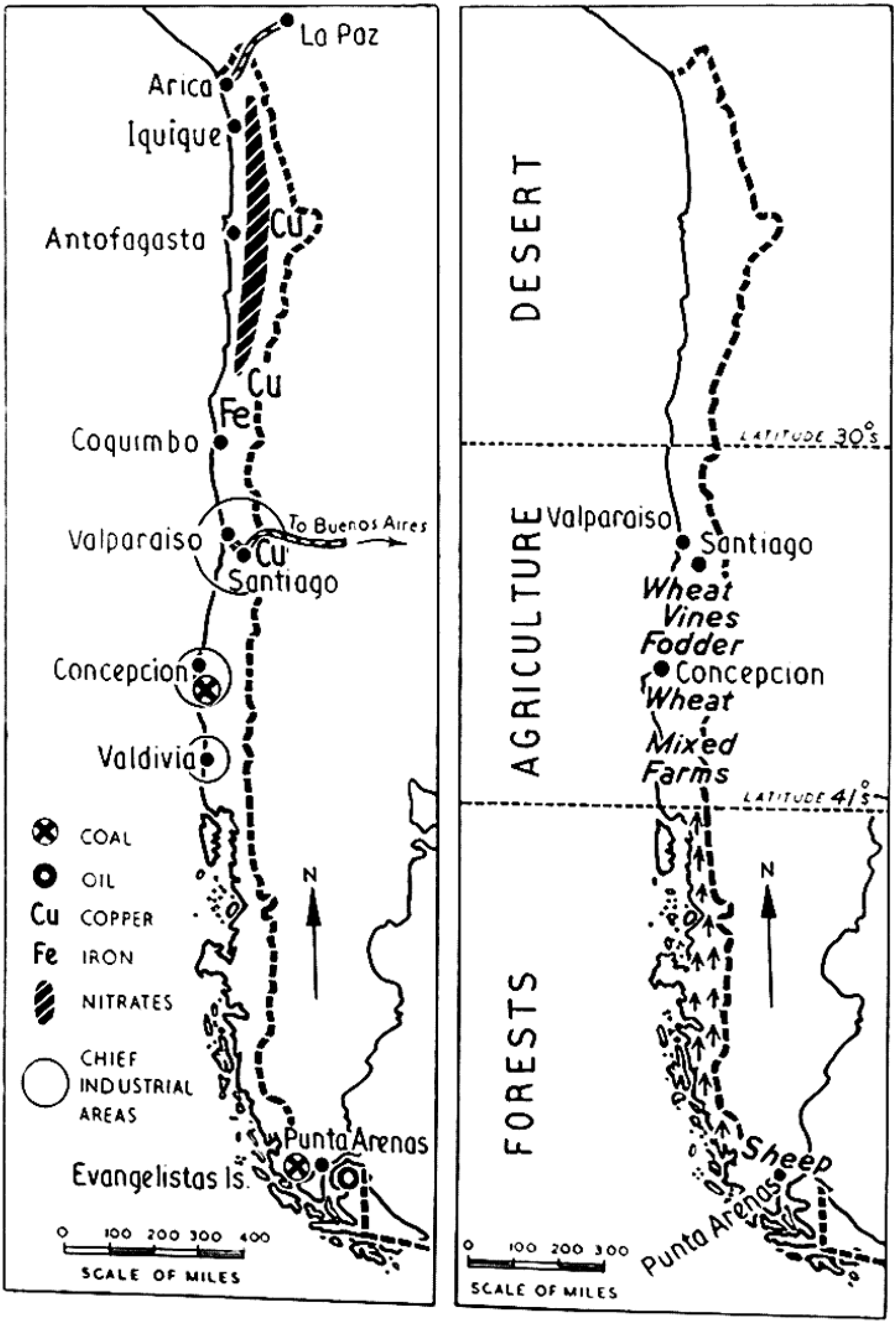


Fig. 51. CHILE: ECONOMIC RESOURCES.

on the coast vary from about 11° C. (*52° F.*) to 18° C. (*64° F.*). In the central valley, which is between 1,000 ft and 2,000 ft above sea level, the annual range of temperature is somewhat greater [Santiago, 1,700 ft above sea level, 8° C. (*46° F.*) to 21° C. (*69° F.*)]. Rainfall increases southwards (Valparaiso 19·3 in., Concepcion 30 in.), while the length of the summer drought decreases. The natural vegetation is drought-resisting, evergreen scrub similar to the maquis of Corsica and the chaparral of California.

Summer drought makes irrigation necessary but plenty of water is supplied by streams fed by Andean snows. Many of the farms, or *haciendas*, are very large estates consisting of fields surrounded by irrigation trenches and broken through by dusty roads lined with eucalyptus and poplar trees. The farmhouses are often large and surrounded by trees. Nearby are farm buildings, *bodegas* (wine factories), and workmen's homes—almost like a small village. Of recent years there has been a tendency to split up some of the large haciendas into smaller farms. All the haciendas have vineyards and orchards. Peaches, pears, plums, apricots, and melons are produced—some melons for export to the U.S.A.—but unlike most areas which have a Mediterranean climate, fruit is not predominant. Olives, a characteristic "Mediterranean" crop, are not grown, because summer temperatures are too low. The chief use of the land is for maize, beans, wheat, and alfalfa. Agricultural methods are rather primitive. Most farms keep cattle which are driven to mountain pastures in summer and, in winter, return to the valley where they are fed on alfalfa and other fodder.

SOUTH MIDDLE CHILE lies south of latitude 38° S. and shows a distinct change of climate and vegetation. Rainfall increases and summer drought disappears, although there is still a marked winter maximum (Fig. 50, p. 212). Deciduous forests and meadowland take the place of the scrub which is typical to the north. On the farms, irrigation is no longer necessary and the big estates give place to smaller farms.

Mixed farming, producing cattle, wheat, oats, and potatoes, is the chief occupation. The cattle are chiefly used locally for meat. Only a comparatively small amount of lumbering is done considering the available trees; it provides wood for fuel, building, and the making of furniture in Valdivia.

A poor-grade coal is mined in the Lebu peninsula south of Concepcion. It is unsuitable for making coke and is chiefly used for domestic fuel, and on the railways. Better quality imported coal and oil are necessary for industrial purposes.

POPULATION, INDUSTRIES, AND TOWNS OF MIDDLE CHILE. About 90 per cent. of the population of Chile live in Middle Chile and the greater part of these are in the northern part. Population is concentrated in the towns and along the railway which runs down the central valley. The concentration of population in Middle Chile is largely due to the fact that this part of Chile has the most favourable climate and also to the rise of industries in this area. As an industrial country Chile is hampered by lack of good coal. There is, however, abundant hydro-electric power in Middle and Southern Chile which supplies 90 per cent. of the population. Local sources of materials are largely used in manufactures, although sugar from Peru is imported for Chilean refineries. Manufactured products include wine, leather goods, flour, and woollen textiles. The Government takes an active interest in the development of industry, and has built a plant near Concepcion to produce steel, iron sheets, and tin plate.

Most of the industries are concentrated in the four towns of Santiago, Valparaiso, Concepcion, and Valdivia.

*Santiago* (2,314,000) is the capital and centre of commerce, industry, and culture. It is connected by road and rail with the chief towns of Chile and with Buenos Aires. It is a city of fine views and beautiful buildings.

*Valparaiso* (262,000), situated on a gap in the coastal range, is the chief port of Chile. It is one of the few Pacific coast ports which has a natural harbour. It has been improved by the building of a breakwater and docks.

*Concepcion* (168,000) and *Valdivia* (73,000) are situated on the estuaries of small rivers; both have outports. Concepcion is a manufacturing town near the Lebu coalfield and is growing in importance. *Valdivia* is a city of German colonists and their descendants, and has leather and furniture-making industries.

### Southern Chile

WESTERN SLOPES OF THE ANDES. Southern Chile, west of the Andes, is a country of mountains, lakes, and valleys. Streams which sometimes rise on the eastern side of the Andes flow through deep, glaciated valleys to the Pacific Ocean. It has an island-girt fiord type of coastline since the sea has drowned the lower parts of the valleys. The Central Valley, so important in Middle and North Chile, disappears south of latitude 45° S., spurs of the mountains coming right down to the sea.

Southern Chile is a country of cloud, rain, wind, and storms. The average annual range of temperature of the Evangelistas Isles is 39° F. to 48° F. Although its winters are warmer than similar latitudes in the Northern Hemisphere, the lack of sunshine and continual rain make it one of the most unpleasant climates in South America and very unattractive to settlers. It is therefore very sparsely populated. Most of the people are Indians who gain a scanty living by fishing.

The natural vegetation is evergreen forest but lack of communications and wet, soggy ground have made conditions too difficult for the development of lumbering which is its chief potential.

CHILIAN TIERRA DEL FUEGO. In the extreme south, the Andes, now only a few thousand feet in height, sweep into the south-east of Tierra del Fuego, an island separated from the mainland by Magellan Strait. Numerous islands fringe the coast. The whole area is wind-swept and subject to sudden and violent storms. In the past it attracted a few hardy adventurers who sought seal and nutria skins, or searched for gold in the streams. There are now a few families of Indians who seem to be decreasing in number.

Oil is produced at Springhill, in the north of Tierra del Fuego. The crude oil passes by pipeline to a port on the Straits of Magellan. Most of it is taken to Valparaiso for refining. The oilfield supplies most of the oil Chile needs.

CHILIAN PATAGONIA. The most important part of South Chile lies east of the Andes, bordering the northern shores of Magellan Strait. It lies in the rain shadow of the Andes.

The rainfall is small (Fig. 50) and although it is sufficient for small trees to grow on the mountain slopes, the lower land is covered by sparse pastures. As in Argentine Patagonia (p. 203), a thriving sheep industry has been developed, which provides most of Chile's wool. Freezing plants produce frozen mutton and meat products. A coalfield near Punta Arenas is worked for local demands but the coal is low grade and too far from the industries of Chile to be important.

*Punta Arenas* (45,000), the southernmost city in the world, is a port on the side of an inlet and a calling place for ships passing through the Magellan Strait. It exports wool, frozen mutton, and sheepskins.

## People of Chile

Chile, which has a population of eight million, mainly mestizos descended from the Spanish conquerors. They form a virile people, making up about 70 per cent. of the total. Of the rest, pure Indians constitute about 5 per cent., and people of unmixed European descent about 25 per cent. The make-up of Chile's population is therefore very different from that of Argentina where pure whites predominate (p. 191). The population is increasing rapidly—much faster than agricultural output. Chile's most pressing problem is to grow enough food. Many people suffer from malnutrition, although some sections of the community have a high standard of living.

## The Trade of Chile

The chief exports of Chile are minerals, timber, cereals, vegetables, fruit, wool, and mutton. Minerals, including nitrates and copper which are semi-manufactured, constitute by far the largest value of exports. Copper alone accounts for about two-thirds of Chile's export earnings. This is a weakness in Chile's economy since she depends too much on one type of product. In agriculture, exports of wool and mutton are greatest in value. The U.S.A. is the best buyer of Chilean goods. Other main consumers are Britain, West Germany, the Netherlands, and Argentina.

The imports of Chile include machinery, manufactured goods, raw cotton, petroleum, and foodstuffs—mainly sugar. The main suppliers are the U.S.A., West Germany, and Great Britain.

## PERU

Peru stretches along the west of South America from about latitude 3° S. to latitude 18° S. Before the Spanish Conquest, Peru was the centre of the Inca Empire (see p. 149), and it still contains a large proportion of Indians. Most of its eleven million people are mestizos or Indians who form the lower classes. The country and its wealth are controlled by the small Spanish ruling class.

### Surface Features

Peru extends on both sides of the Andean Highlands (Fig. 52) and may be divided into three regions which trend from north to south:—

(1) The Western Coastal Area.

(2) The Andean Highlands.

(3) The Interior Lowlands.

### The Western Coastal Area

The north-west coast consists of areas of lowland interrupted by spurs of mountains which reach the coast; towards the south, mountains fringe the coast. There are no good natural harbours unless the harbour has been improved by breakwaters. Larger ships have to anchor off shore and discharge and load their cargoes by means of lighters. Numerous streams which rise in the Andes, cross the coastal area, their valleys forming fertile oases.

CLIMATE. Except in the extreme north, the western coastal area of Peru is a desert. Trujillo, Lima, and Mollendo, average less than 2 in. of rain a year, and even this amount is unreliable; in some years it may be rainless. However, above about 5,000 ft on the western slopes of the Andes, the rainfall is sufficient to provide water for numerous streams.

The rainless character of the coast is largely due to the upwelling of the cold waters and to the cool Humboldt or Peruvian coastal currents. Southerly winds become cooled as they pass over these cool waters and therefore they can hold only a relatively small amount of moisture. As they pass inland over the warmer land of the coastal lowlands there is little tendency for condensation. It is only after the winds have been cooled by rising up the slopes of the mountains that their saturation point is reached and rain falls. However, the cool current

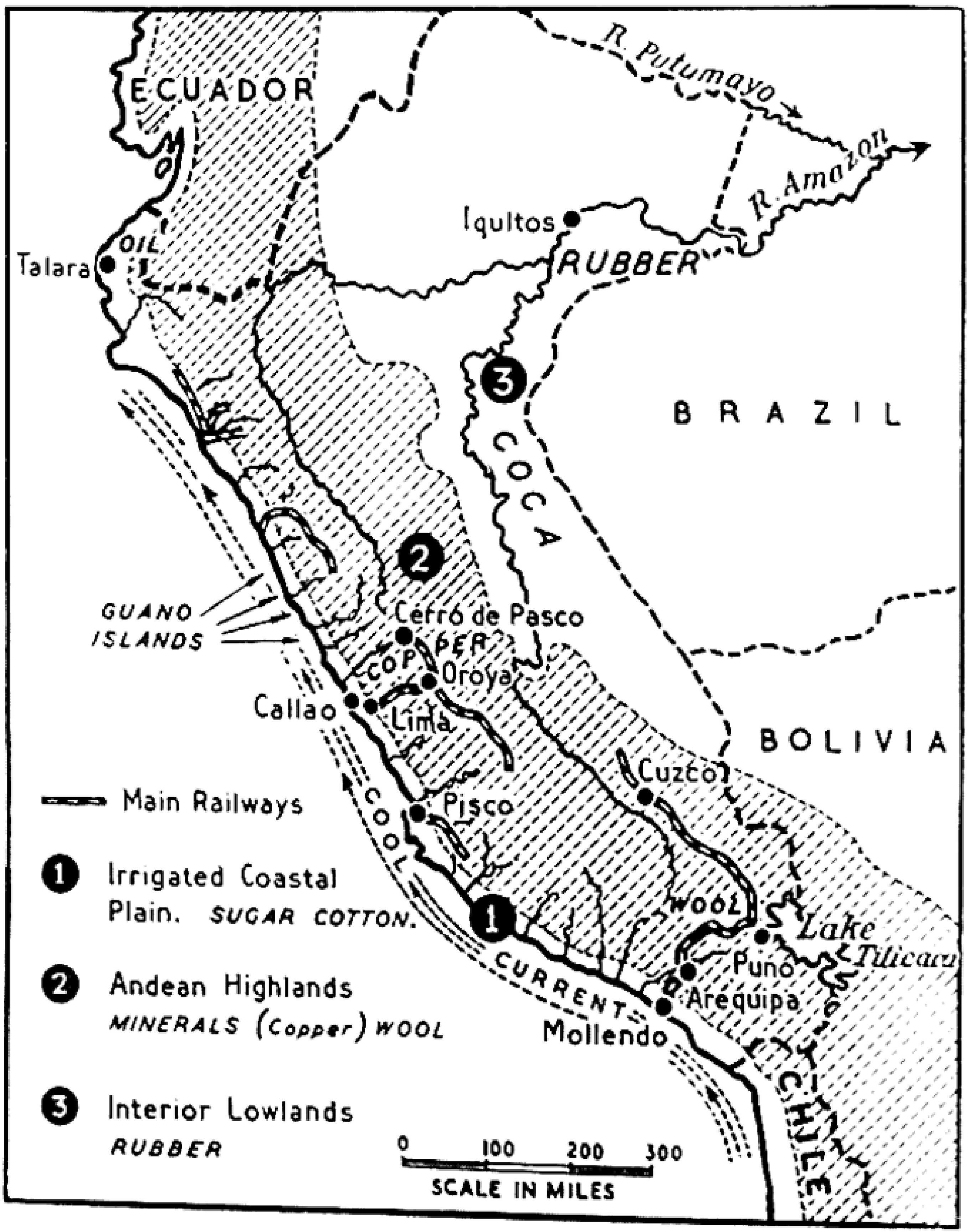


Fig. 52. Peru.

sometimes cools the winds sufficiently to cause coastal fogs. Similar effects have been noticed where the winds pass over the cool current off the western desert coasts of Africa.

Not only is the Humboldt Current largely responsible for the desert conditions on the coast, it also causes the average annual temperatures to be some 6° C. (*10° F.*) lower than at similar latitudes on the east coast of South America.

Trujillo (Peru) (latitude 8° S.) has an average annual temperature of 21° C. (*69° F.*) compared with 27° C. (*80° F.*) at Recife (Brazil) (latitude 8° S.).

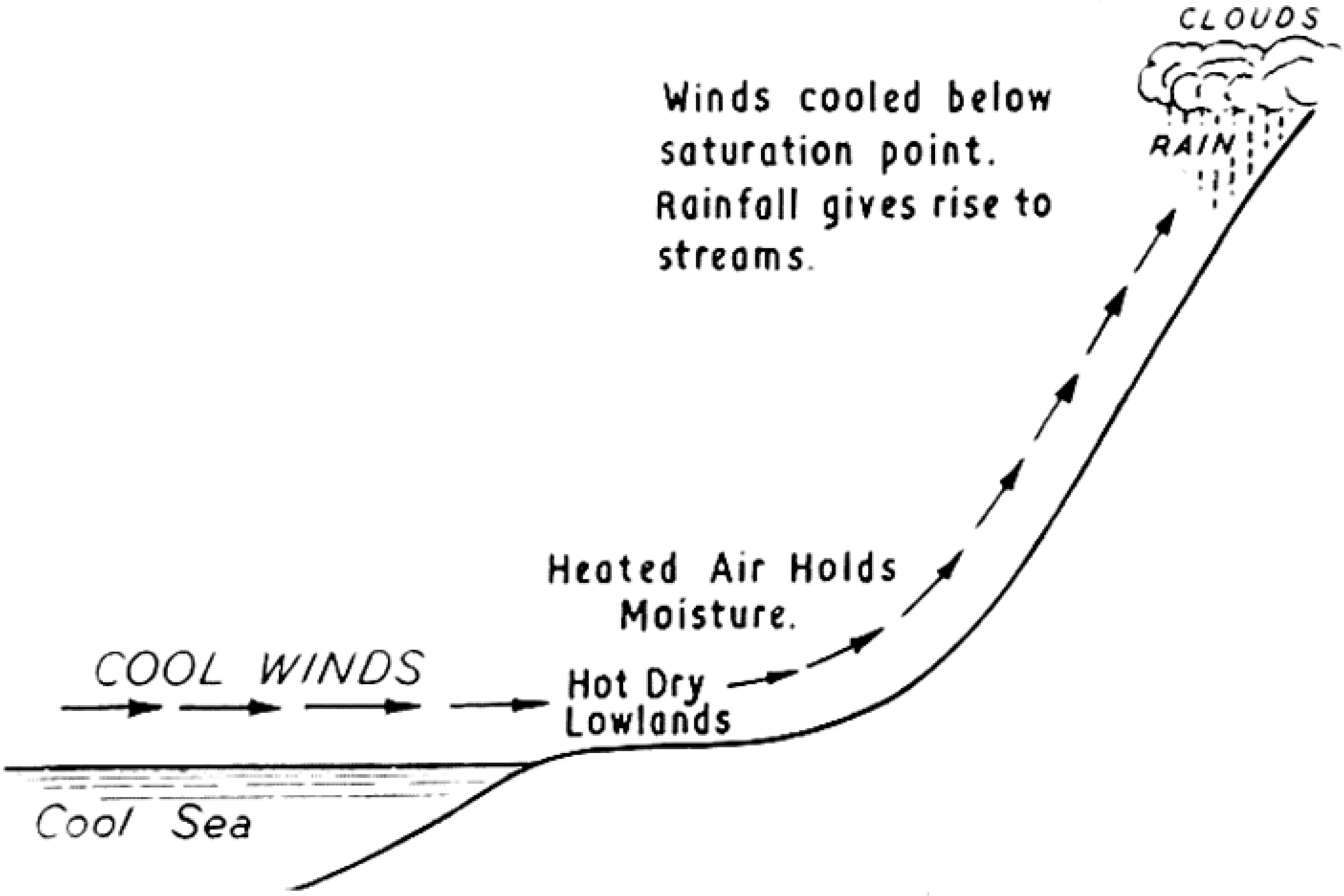

CLOUDS
Winds cooled below saturation point. Rainfall gives rise to streams.
RAIN
Heated Air Holds Moisture.
COOL WINDS
Hot Dry Lowlands
Cool Sea

Fig. 53. How Mountain Streams are formed in Western Peru.

This lower temperature makes white settlement easier on the coast of Peru than in similar latitudes in Brazil. Indeed, Lima, the capital of Peru, and the centre of its economic and cultural life, is situated in the western coastal area.

Products and Occupations. Although the west coast is largely desert, it is the principal agricultural area of Peru since many streams which cross the area provide water for irrigation. The cultivated areas lie in the valleys some way inland from the coast and are often isolated from other valleys by bare, hilly country. Roads and short railways connect them with the coast and provide the main outlet for trade.

*Cotton* is the leading export crop of Peru. The long, silky fibre is grown on plants which form bushes up to 15 ft in height and are perennial. About nine-tenths of the crop is exported; the rest is used in textile mills, mostly situated near Lima. The chief areas of production lie in the Rimac Valley in which Lima is situated, and behind Pisco, although it is the chief crop in all valleys from Pisco to about 200 miles north of Lima. It is also cultivated in some of the northern valleys.

*Sugar-cane* is the chief cash crop of the northern valleys. Many of the estates are large and equipped with modern machinery. Peru, after Brazil, is the second largest sugar-producing country of South America. Pieces of cane are planted in trenches and after about eighteen months the first cutting takes place. Further cuttings may go on for several years without replanting. Much of the work is done by Indians who come down from the highlands when work is slack on their own small farms.

Other crops include rice, maize, fruit, and coffee, as well as fodder crops. Alfalfa is grown to feed cattle which spend part of the year on the pastures on the wetter slopes of the mountains.

THE GUANO INDUSTRY. Guano (from an Indian word meaning dung) consists of the droppings of thousands of sea birds on a group of desert islands off the coast of Peru. It is indirectly a product of the cool Humboldt Current. The birds are attracted by the millions of fish which feed on the many small marine plants found in the cool waters. These birds feed on the fish, roosting and nesting on the desert islands where their droppings accumulate because there is no rain to wash them away. Early in the nineteenth century the explorer Humboldt noted the presence of guano, but diggings on a big scale did not take place until the middle of the century when they were found to be valuable as fertiliser, very rich in nitrogen. Guano was then exported on a very large scale and became the principal source of wealth. Eventually it seemed as if the valuable deposits might be exhausted. Today the birds are protected by law and digging of guano is restricted. Large numbers of birds have been lured to peninsulas on the mainland where the guano can be more easily obtained. Peru takes the whole output for her cultivated lands but this does not provide all the fertiliser needed. The export of guano is forbidden.

FISHING. Fish are caught in the cool waters along the Peruvian coast—mainly anchovy. Large quantities of fish paste are made and exported but most of the catch is converted into fishmeal, a valuable animal feeding stuff. Indeed, Peru produces more fish meal than any other country in the world. The chief fishing ports are *Callao* and *Chimbote.*

PETROLEUM. Oil occurs in the north around Lobitos and is refined and shipped from the port of Talara. It is particularly valuable in the industries and transport of Peru and Chile, since the Pacific Coast of South America is short of mineral fuels.

IRON ORE. Near the coast half-way between Callao and Mollendo lie the Marcona iron deposits. Some of the ore is shipped to the modern port of Chimbote on the Santa River. A large steel works has been built near Chimbote using coal and hydro-electricity from the Santa River. Peru is already second to Venezuela as a supplier of iron ore to the U.S.A.

TOWNS AND INDUSTRIES. *Lima* (1,716,000), the capital, is the largest city of Peru. It is situated in the fertile valley of the Rimac and is the economic and cultural centre of the country. Most of the manufacturing industries, such as textiles and food products, are situated here. A dam on the Mantano River, a tributary of the Amazon, holds back water for a hydro-electric plant which serves the Lima-Callao industrial area. The main city and its suburbs are well built and clean but there are distressingly squalid slums on the outskirts, reflecting the extremes of wealth and poverty. Lima is connected by road and rail with the port of Callao.

*Callao* (162,000), the chief port, has a harbour equipped with long breakwaters so that ocean-going ships may dock. It is joined to the mineral area of the plateau by railway.

*Mollendo* (15,000), in southern Peru, exports wool from the plateau with which it is connected by railway.

Small ports occur at the mouth of most of the rivers. These serve the cultivated lands behind and are made necessary by the lack of roads and railways on the land.

## The Andean Highlands

Between the Eastern and Western Andes lies one of the highest inhabited plateaux in the world. Its surface consists of a series of intermont basins some of which contain lakes. Lake Titicaca, the highest freshwater lake in the world, lies in one of these basins. On its eastern side, the plateau is cut by the deep valleys of rivers which drain to the Amazon Basin.

CLIMATE. The plateau is characterised by an extreme daily range of temperature. The sunshine in the day warms the air but at night heat radiates quickly and temperatures frequently drop below freezing point. There is also a marked difference between temperatures experienced in the sun and those in the shade. On the other hand, the annual range of temperature is small, being about 3½ C°. (*6 F°.*) at Puno (12,500 ft) which has a mean annual temperature of 9° C. (*48° F.*). The upper parts of the plateau are bleak and windswept throughout the year.

The amount of rainfall varies with altitude and the extent to which the place is exposed or sheltered. In general, it decreases towards the south and occurs mostly in summer. It is usually sufficient for such crops as potatoes and barley, ranging from 30 in. to 40 in. a year. Since the pressure of the air is lower and the amount of oxygen less at high altitudes, newcomers to the plateau often find exertion difficult and even harmful to health.

NATURAL VEGETATION. Plant life varies with altitude. Above 17,000 ft there is very little and between about 14,000 ft and 17,000 ft are the bleak Paramos where vegetation is sparse and cultivation impossible. Poor mountain pastures with resinous bushes characterise the altiplano which extends from about 11,000 ft to 14,000 ft. The pastures provide food for native animals such as the vicuna, alpaca, and llama, and for sheep which were introduced from Europe by the Spaniards. Indians grow a few subsistence crops. Below 11,000 ft lie the valley bottoms which may be wooded and where a greater variety of crops may be grown such as maize, wheat, and fruits, but they are too inaccessible to attract much settlement.

Most of the inhabitants of the plateau are Indians. They live in small stone huts and gain a scanty livelihood by keeping flocks of vicuna, alpaca, llamas, and sheep, which provide them with wool for spinning, and for weaving material for clothing. Most of them wear an outer garment rather like a blanket—with a hole in the middle for the head—called a poncho. This garment is particularly useful in a region where temperatures vary greatly from night to day, and sun to shade, since it may be thrown open when it is warm and wrapped tightly round when it is cold. The llama is used as a beast of burden since it thrives in high altitudes and is sure-footed on steep mountain paths. Bundles are fastened over the backs of the animals which are driven in flocks from one place to another, often crossing the mountains to the coastal plain. A llama can carry about 100 lb. The Indians also grow potatoes, barley, and a native seed-plant called quinoa which form their chief food. A few Indians work in mines, or go down to work in the cultivated lands in the coastal valleys (pp. 222-3). The standard of life of the Indians is very low and their existence is one of poverty and discomfort. Few show any desire to rise above their miserable lot. The chewing of coca leaves which contain cocaine, and are grown on the eastern slopes of the Andes (p. 228), is a universal habit.

The rearing of sheep for wool is the chief industry of the area near Puno. The Government is interested in improving the breeds. *Arequipa* (160,000), on the railway between Puno and the sea, is the chief centre where the wool is cleaned, baled, and despatched to Mollendo for export.

MINERALS OF THE PLATEAU. The chief wealth of the plateau lies in its minerals. The gold which the Incas obtained from the plateau was the chief attraction which brought the Spanish conquerors to the country (p. 152). Copper, gold, and silver, are now the principal minerals mined. Peru is also the chief source of the world's vanadium, a mineral used in the production of special steel alloys. The mineral concerns are owned and managed by white people with the aid of Indian and mestizo labour. Production is hindered in the following ways:—

(*a*) *Transport difficulties.*—Only two railways link the coastal ports with the plateau. The central line from Lima serves the principal mining area of Oroya and Cerro de Pasco where 90 per cent. of the minerals are obtained. Most of the mines are situated near this railway. It is probable that rich deposits occur in other parts of the plateau but lack of rail facilities prevents their development. The only means of transport for some smaller mines is by mule or llama, a slow and uneconomical means of transport.

(*b*) *Lack of fuel.*—Lack of fuel is another major difficulty. Although coal is known to occur in Peru, the only deposits worked are those which provide fuel for the Cerro de Pasco copper mines. The smaller mines make use of local resinous plants and dried llama dung, while most of the bigger concerns have to import oil and pay heavy transport charges. Hydro-electric power is, as yet, little developed.

(*c*) *Labour difficulties.*—Much of the Indian labour is inefficient and unreliable, and the difficulty of working in the rarefied air of high altitudes makes Indian labour necessary, since they are used to these conditions. White managers and technicians are forced to visit the lowlands several times a year in order to regain their health. This adds to the working expenses of the mine. Such difficulties hinder production and hold up the development of the minerals of the plateau. In spite of this, copper and gold are important exports of Peru.

TOWNS. *Cuzco* (80,000), the old Inca capital, lies 11,000 ft above sea level on the eastern face of the Andes. It is connected by rail with Lima and has small woollen mills.

### The Interior Lowlands

To the east of the plateau, deep river valleys descend to the Interior Lowlands—a hot humid region, clothed with luxuriant equatorial forests known as the Montana. No railways or good roads connect the Interior Lowlands with the rest of Peru. Owing to its remoteness, few people, mostly Indians, live there, and it is of little economic importance. The chief forest products are wild rubber and a gum called balata.

The Montana Forests are the natural home of the cinchona tree, from the bark of which quinine is produced. At one time, Peru was the only source of quinine but since cinchona plantations have been introduced into the East Indies, Peruvian production has practically ceased. Another Montana native shrub is coca, the leaves of which contain the drug cocaine. It is cultivated in the upper parts of the valleys and much of the crop is sent up to the plateau where it is in great demand by the Indians who chew the leaves to give them greater powers of endurance against cold and hunger. It also tends to make them dull and stupid. Agricultural settlements are few and confined to the valleys. The principal crops of sugar, tobacco, cotton, coffee, and subsistence crops are consumed locally or sent for use on the plateau.

Vast areas in the northern interior lowlands of Peru are rich in petroleum and several new oilfields are being developed.

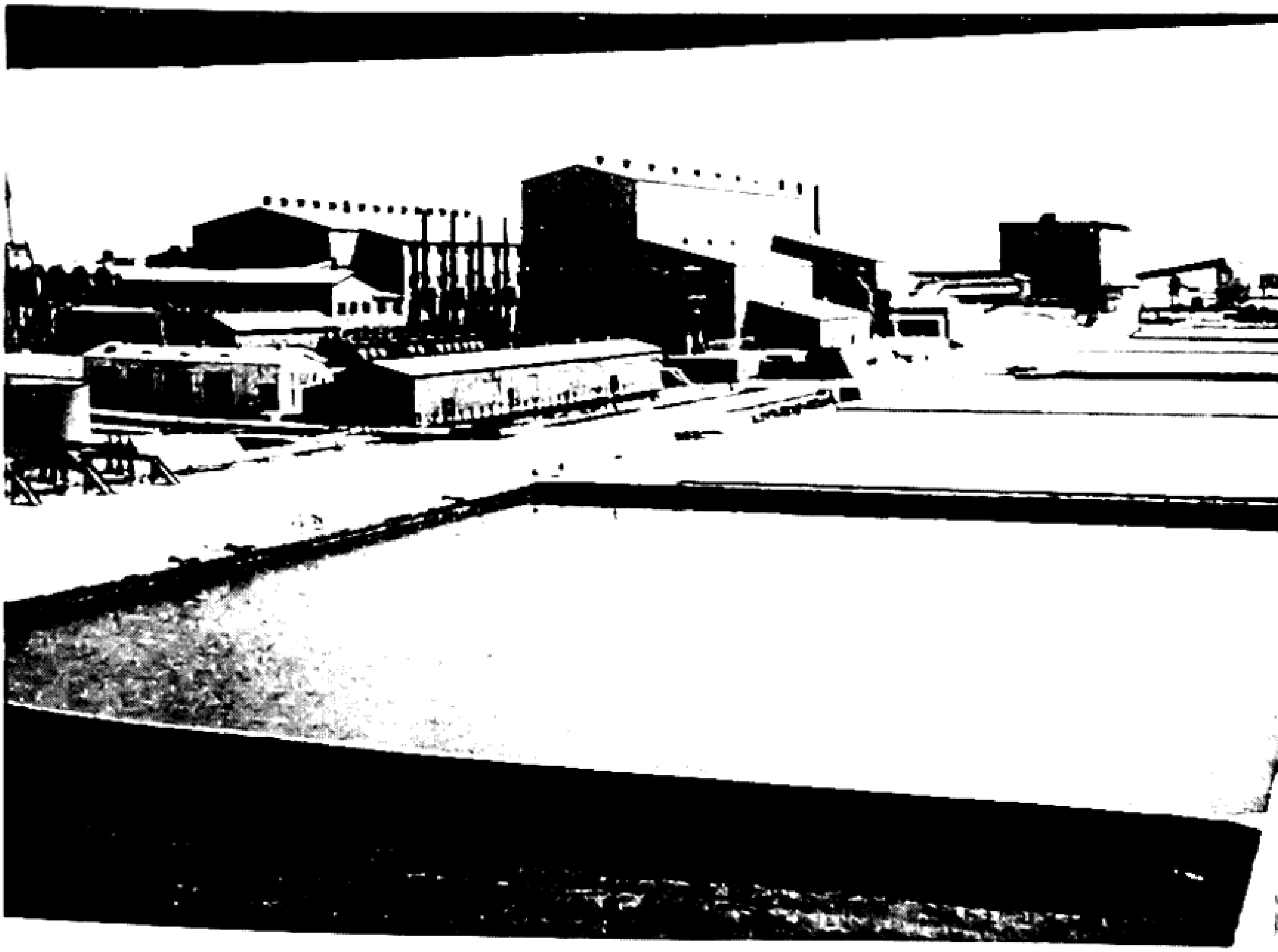
TOWNS. *Iquitos* (56,000), the chief town in the forested interior lowlands, is a river port on the Amazon at the limit of navigation, some 2,300 nautical miles from its mouth. River steamers reach the town and make it the centre for the export of rubber and balata. At one time it was the centre of a booming rubber trade but this has declined and the town is now half its former size. It is, however, growing again with the development of the oilfields.

### Trade of Peru

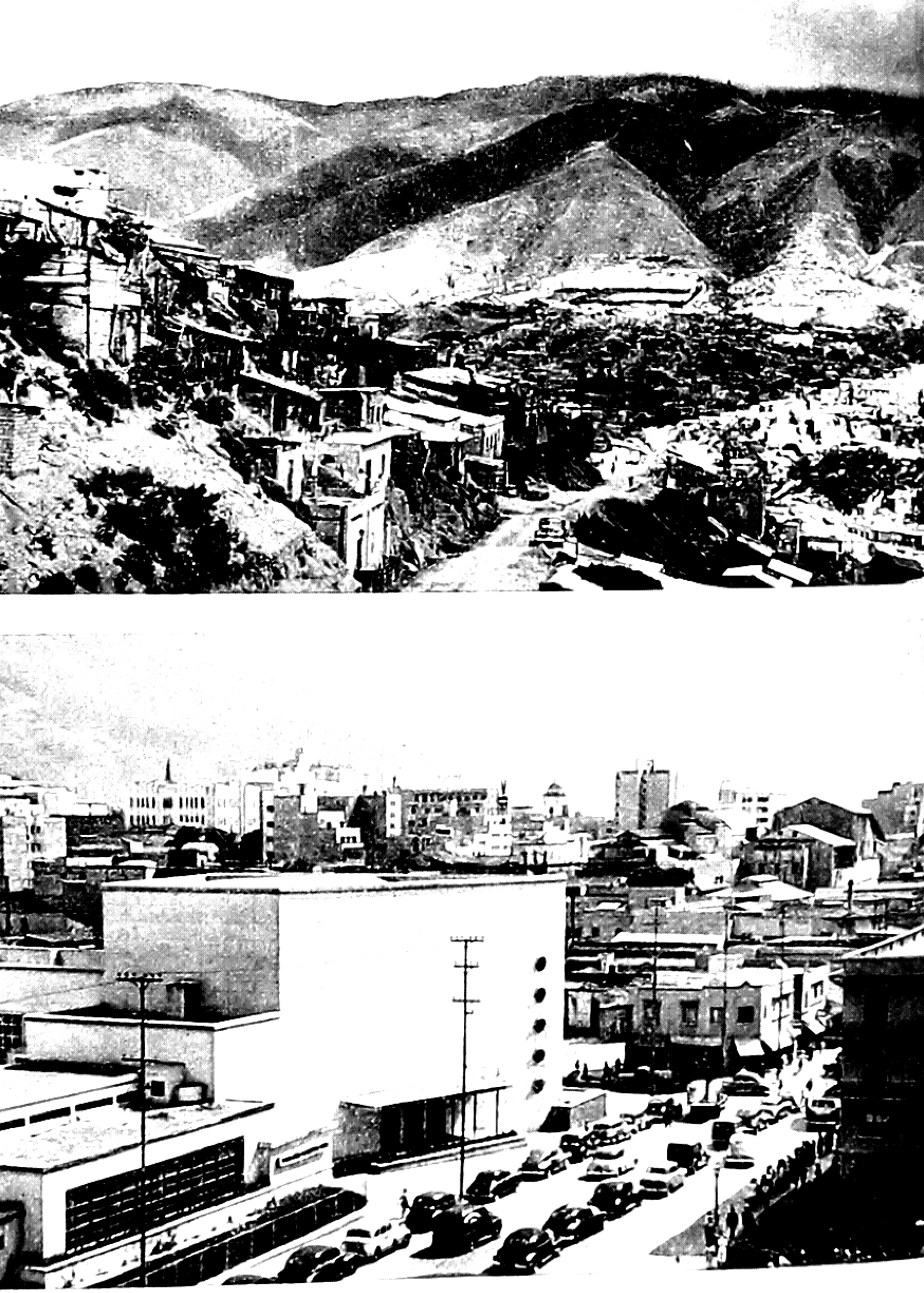
In proportion to its size the foreign trade of Peru is small. Copper, cotton, and sugar have been exported from Peru for many years, but fishmeal now has pride of place, earning nearly one-quarter of the total value. Zinc, lead, silver, and petroleum are also exported.

Imports include foodstuffs, machinery, and chemicals.

The United States, West Germany, and Britain are the chief customers for exports and the United States, West Germany, and Britain supply manufactured goods as imports.



*Above.* Northern Chile. Blasting Caliche. (*Nitrate Corporation of Chile, Ltd.*)
*Below.* Extraction Tanks in which the Caliche is Dissolved for the Separation of Nitrate. (*Nitrate Corporation of Chile, Ltd.*)



Venezuela. The Exploitation of Oil has brought Sudden Access of Wealth to the Country without Improving the Position of a Large Part of the Population. Compare *(above)* the Miserable Shacks on the Outskirts of Caracas and *(below)* the Prosperous Commercial Centre of the City. *(Picture Post.)*

# CHAPTER XIV

## THE ANDEAN COUNTRIES: BOLIVIA, ECUADOR, AND COLOMBIA

## BOLIVIA

Bolivia is an inland country whose nearest outlet to the sea is through the Chilean ports of Arica and Antofagasta. Its population of five million consists mostly of pure Indians and mestizos; there are very few Europeans of pure descent.

### Surface Features

Nearly half the country is mountainous, the remainder consisting of the interior lowlands. The mountainous part of the country contains most of the population and economic products. It is convenient to divide Bolivia into the three relief divisions given below (Fig. 54):—

(1) The high mountains and plateau.

(2) The slopes and valleys of the Eastern Andes.

(3) The interior lowlands.

### The High Mountains and Plateau

The high mountains and plateau occupy the western portion of Bolivia and are a southern continuation of those previously (p. 224) described in Peru which they resemble in many ways. The western edge is composed of lofty ranges of mountains which contain many active volcanoes, some over 20,000 ft in height. Spurs from these mountains divide the western part of the Bolivian plateau into high-level basins known as the altiplano. The deep freshwater lake of Titicaca, and the salt lake of Poopo, are situated in two of these basins. On the eastern side of the plateau the mountain spurs fade out and there is comparatively easy communication from north to south.

CLIMATE. The climate of the plateau varies with altitude but it is generally unpleasant. Big daily ranges of temperature and biting winds are common, and frost may occur at any time of the year. Somewhat better conditions are experienced in Lake Titicaca Basin where the lake has a moderating influence and temperatures are consequently higher. La Paz also enjoys better climatic conditions, since it is situated in a deep valley:—

LA PAZ, 12,000 ft above sea level.

| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Temp. in °C. | 11 | 11 | 11 | 9 | 8 | 7 | 7 | 8 | 9 | 10 | 12 | 11 |
| Temp. in °*F*. | *52* | *51* | *51* | *49* | *47* | *44* | *45* | *46* | *48* | *50* | *53* | *52* |
| Rainfall in inches. | 3·9 | 4·5 | 2·6 | 1·5 | 0·5 | 0·1 | 0·2 | 1·1 | 0·8 | 1·3 | 1·5 | 4·3 |

Rainfall occurs mostly in summer and decreases markedly in the south where arid conditions prevail south of Oruro. With an average altitude of over 12,000 ft, and an inclement climate, the altiplano is grey and treeless. Its poor grass and resinous bushes are only fit for pasturing llamas, alpacas, vicunas, and sheep. The chief agricultural area is in the Titicaca Basin where Indians grow barley and potatoes. Towards the south the population is sparse and, except near mines, consists of nomadic shepherds. The standard of life of the Indian farmer is very low.

MINERALS. Minerals, especially tin, are the chief economic products of the highlands. Mining has developed chiefly near the railways. As in Peru (p. 227), its development suffers from lack of fuel, poor labour supply, and transport difficulties. There is great potential water power in the Eastern Andes but little has yet been converted into electricity. Dried llama dung and resinous plants are used as fuel in some of the smaller smelters, since imported fuel is very expensive. Most of the mineral ores are concentrated in Bolivia and exported to Britain and the U.S.A., where they are smelted. Indians do most of the manual work at the mines. Until the end of the nineteenth century, silver was the chief ore produced. Now tin is by far the most important. It occurs in mineral veins in many parts of the plateau but is principally worked near Oruro and Potosi. Bolivia produces about 15 per cent.

of the world's supply of tin and ranks third in output. The ores, however, are not rich and the cost of production is high so that Bolivia finds it more and more difficult to compete in world markets. Other minerals include silver, lead tungsten (used in making high-grade steel), zinc, gold, antimony, copper, and bismuth, used when alloyed with lead and tin, for the making of safety fuses in electrical apparatus and is also used in medicine. Bolivia is the world's chief source of bismuth.

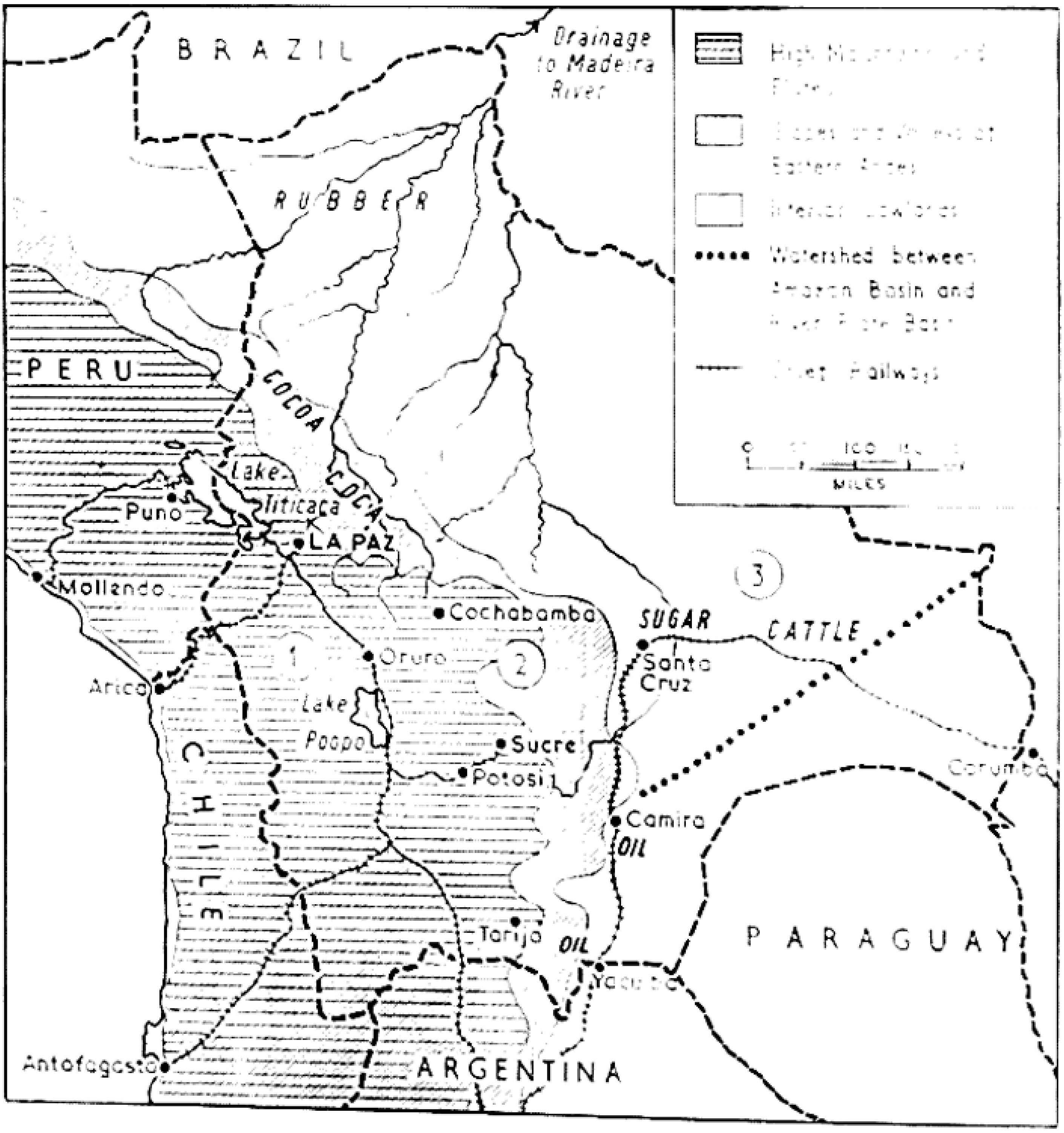


Fig. 54. BOLIVIA: NATURAL REGIONS.

TOWNS. *La Paz* (353,000) is the chief city of Bolivia, and centre of the economic and educational activities. It is situated in a deep valley 12,000 ft above sea level. Round the town, the sides of the valley tower some 2,000 ft above it, protecting it to some extent from the disagreeable climate of the plateau. In colonial days La Paz controlled the chief route from Lima to the silver mines of Potosi and the agricultural settlements of north-western Argentina. The main Bolivian railway now passes along this route and connects it with the mining area of Oruro and Potosi. A railway also links La Paz with the port of Arica. La Paz, the highest city in the world, is a modern town but its great altitude and consequent rarefied atmosphere makes it unfavourable for permanent white settlement.

*Oruro* (87,000) is the third city in Bolivia. It is situated on the main railway, near the junction of two branch lines, one of which connects the town with the important agricultural district of Cochabamba on the eastern slopes of the Andes. Oruro is also situated in the chief tin-mining area. It has thus become a centre connecting the agricultural area of Cochabamba with the mining community of the plateau.

### The Slopes and Valleys of the Eastern Andes

The eastern slopes of the Andes are deeply dissected by fertile valleys and basins. It is here that most of the pure whites and more virile mestizos live.

Climate. Although the climate varies with altitude, it is much pleasanter than that of the plateau. To the north of Cochabamba the valleys and slopes, which lie between 5,000 to 8,000 ft above sea level, experience average monthly temperatures of over 16° C. (*60° F.*), and a heavy rainfall. A belt of mountain forest, which is a southern continuation of the Montana of Peru (p. 227), is here known as the Yungas. To the south, rainfall decreases and irrigation is usually practised in the dry season.

Cochabamba, 8,448 ft above sea level.

| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Temp. in ° C. | 19 | 18 | 17 | 17 | 16 | 14 | 16 | 16 | 18 | 20 | 20 | 19 |
| Temp. in ° *F.* | *66* | *65* | *63* | *62* | *60* | *57* | *60* | *61* | *64* | *68* | *68* | *66* |
| Rainfall in inches. | 4·1 | 3·8 | 2·4 | 0·4 | 0·4 | 0·3 | 0·2 | 0·2 | 0·7 | 0·6 | 1·3 | 3·9 |

Agriculture is the chief occupation of the valleys. Maize is the chief crop and much of this is used in the manufacture of an alcoholic drink called chica. Barley is also grown, principally for manufacture of beer. Other crops include sugar, cocoa, coffee, vegetables, and fruits. Coca, the source of cocaine (p. 228), is also widely cultivated. Most of these products are either consumed locally, or find a market in the mining communities and cities of the plateau. Indians are large buyers and consumers of coca.

The eastern valleys of Bolivia have the densest areas of population in the country with the most politically minded and energetic of the Bolivian people, but the region suffers from difficulty of access. Railways link the two chief towns of Cochabamba and Sucre with the plateau and there are some poor tracks and roads suitable for motors in the dry season. Airlines also connect Cochabamba with Brazil, Argentina, and with the Bolivian plateau. However, access to the sea is too difficult and expensive to make the export of agricultural crops an economic possibility.

TOWNS. *Cochabamba* (92,000) is the second city in Bolivia. It is the centre of a rich agricultural area, and manufactures beer and chica. Rail and air services connect it with the plateau. It is connected by motor road with Santa Cruz.

*Sucre* (60,000), which is the legal capital of Bolivia where the Supreme Court is held, is also the centre of an agricultural area, and is linked by rail with the plateau.

### The Interior Lowlands

About half the area of Bolivia is composed of the interior lowlands. These are difficult to develop since they are so remote from the principal centres of population. There are three main parts:—

(*a*) The northern area is drained by large rivers to the Amazon. Here the climate is hot and wet, and the plains are clothed with thick equatorial forests in the clearings of which live a few primitive Indian tribes. The chief product is rubber, gathered from the forest. The chief outlet is through Brazil via the Rivers Mamore and Madeira and a short railway which was built to bypass rapids. However, the unhealthy climate, lack of labour, difficulties of transport, and the long distance from the sea have kept the output of rubber very low.

(*b*) The Santa Cruz area which is the most productive. Hills break the plain; the rainfall comes mostly in summer and forests give way to savanna. Cattle are reared in the area, and supply dried beef and hides. Increasing quantities of meat are flown to towns on the plateau. Maize, coffee, cassava, cotton, wheat, and sugar are cultivated for local needs.

Oilfields at Camira and Tarija send oil by pipeline to refineries at Cochabamba, and Bolivia now produces enough oil for her own needs and also exports oil to Chile, Argentina, and Brazil. The Brazilian railway runs from Santos to Santa Cruz and, will eventually continue to Cochabamba, providing a valuable link with the coast. Santa Cruz is already linked by rail to Argentina to the south.

(*c*) The Bolivian Gran Chaco. South of the watershed the rivers drain to the Paraguay. Temperatures are high and rain falls mostly in summer when the rivers flood. A dry season follows from May to October. Tall grasses grow on the better soils with clumps of trees near the rivers. Much of the area is only peopled by nomadic Indians. Cattle are reared on a few estancias near the Pilcomayo and Paraguay Rivers. The remoteness of this area is a severe handicap to its development, and agricultural possibilities remain almost untried.

TRADE AND MANUFACTURES. Minerals account for 95 per cent. of the export trade of Bolivia. Tin is by far the most important. Coca and hides form a small percentage of her foreign trade. Britain and the United States are her chief customers for minerals.

Bolivia has few manufactures other than the processing of foods for home consumption. Her imports include foodstuffs, fuel, and mining machinery.

## ECUADOR

Ecuador is another South American country which lies astride the Andes. It has a population of over 5 million. Indians account for about 30 per cent. of the people/ while white descendants of the Spanish conquerors probably make up less than 10 per cent. Unlike Peru, Ecuador has many negroes on its Pacific Coast and these constitute about 15 per cent. of its population. The remaining people are chiefly mestizos.

## Surface Features

The surface features already described for Peru (p. 220) continue northwards into Ecuador with some modifications. The same three divisions may be recognised:—

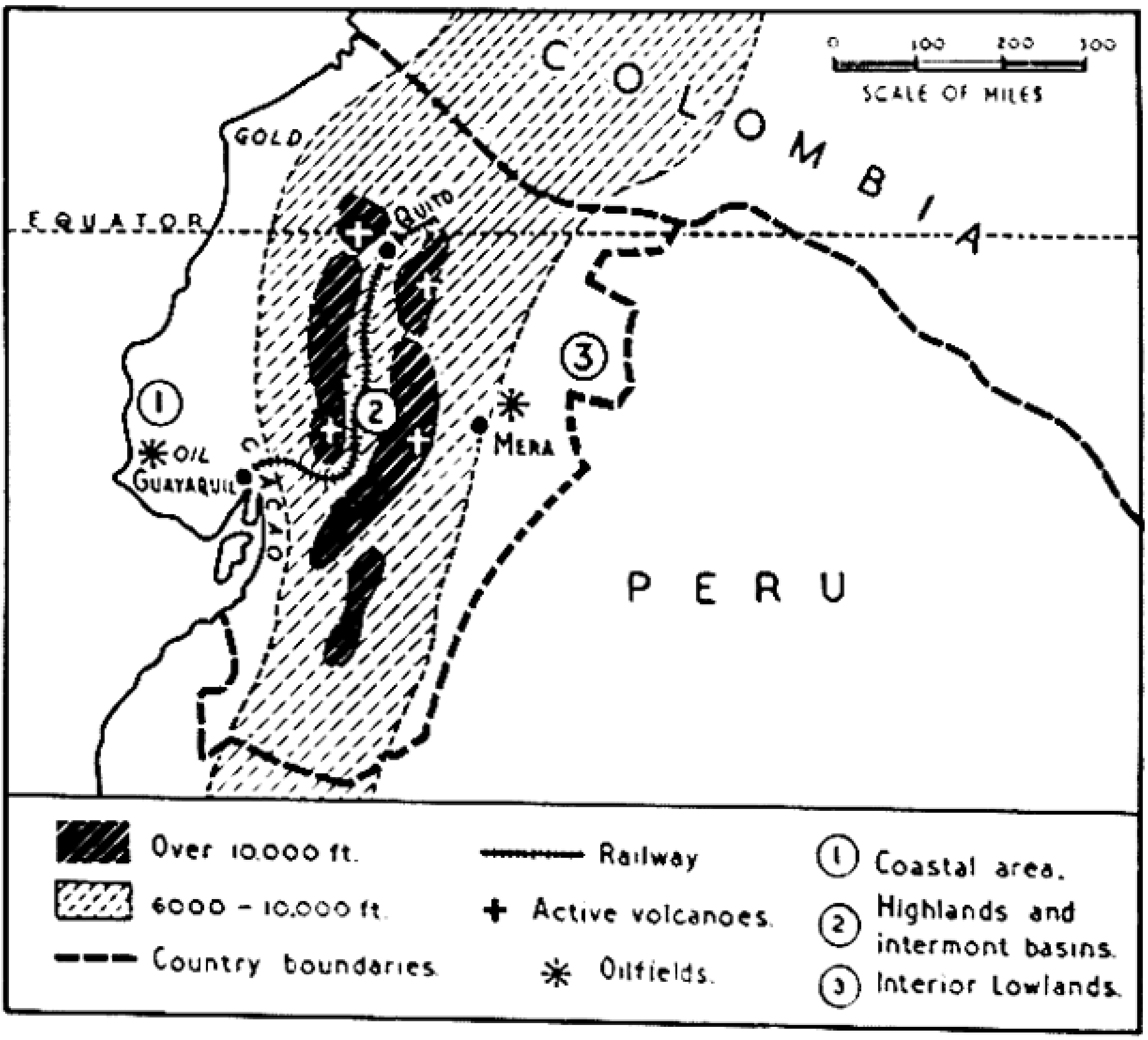


Fig. 55. ECUADOR: NATURAL REGIONS.

(1) The Coastal Area.
(2) The Highlands.
(3) The Interior Lowlands or Oriente.

## The Coastal Area

The coastal area is made up of lowlands separated by low hills. Numerous rivers which rise in the Western Andes descend to the coast forming alluvial cones and swampy fertile plains.

CLIMATE AND NATURAL VEGETATION. The coast stretches from about latitude 5° S. to latitude 2° N., yet in this short length of country, the climate varies considerably. In the north, it is hot and wet throughout the year, a typical equatorial climate. As one goes south, the rainfall is less and falls mostly in summer. The dry season gradually increases southwards until, on the southern borders of Ecuador, almost desert conditions prevail. This change of climate is reflected in the natural vegetation which passes from thick forests in the north, through savanna to thorn scrub in the south.

PRODUCTS. The forests yield two interesting products of some small economic value. The tagua palm is a source of vegetable ivory obtained from the hard white kernels of its seeds, while the fibres from the leaves of the toquilla palm are used by the Indians to make Panama hats. The tropical forests of Ecuador on the Pacific slopes and in the Amazon Basin are the world's chief source of Balsa wood.

The chief agricultural areas lie in the river valleys, the most productive being the lowlands situated near Guayaquil. Cocoa is the chief economic crop. For a long time Ecuador was the chief world producer of cocoa, but since the early years of this century it has been surpassed by other countries, and now supplies only a small fraction of the world's total. The conditions for growing cocoa are ideal—high temperatures, abundant rainfall, fertile loamy soils, and nearness to the coast. The decline of the industry has been partly due to inefficient management which failed to keep pace with the growing world demand, and partly to disease which attacked many of the trees. The owners of the cocoa estates frequently live away from them and allow the estates to be run by managers who have little interest in their development. In spite of setbacks, cocoa remains one of the principal exports. Other money crops include coffee, cultivated on the slopes of the hills, bananas, and rice. Experiments with rubber plantations are also being carried out.

Negroes and Indians predominate in the coastal areas, except in Guayaquil. Most of them are farmers growing subsistence crops such as sugar cassava, beans, rice, and fruits. Some work on the larger estates. In the drier areas, goats and cattle are reared. The cattle are low grade and are used as draught animals or yield inferior meat and hides.

MINERALS. Petroleum, produced west of Guayaquil, is used chiefly for home consumption. A small but variable amount of gold is obtained from alluvial gravels in the northern part of the coastal area and is one of the minor exports.

TOWNS. *Guayaquil* (506,000) is the largest town in Ecuador, and its chief port and commercial centre. It is situated on a navigable river and is surrounded by a rich agricultural district. Its chief business is the export of cocoa beans.

### The Highlands

The Ecuador Highlands are narrower than those of Peru. A lofty range of volcanic peaks forms the Western Andes. Here are many active volcanoes, some of them rising to over 20,000 ft in height. To the east of this range is a stretch of intermont basins having floors 8,000 ft to 9,000 ft above sea level. Quito, the capital, is situated in one of these basins. The high basins are flanked on the east by the range of the Eastern Andes which is dissected by the headwaters of many rivers draining to the Amazon.

CLIMATE AND NATURAL VEGETATION. Being near the equator there is very little seasonal difference in temperatures experienced in the intermont basins. The altitude causes a comparatively low mean monthly average of about 55° F. The daily range of temperature is, however, considerable and frosts at night are frequent:—

QUITO, 9,350 ft.

| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Temp. in ° C. | 12 | 13 | 12 | 12 | 13 | 13 | 13 | 13 | 13 | 13 | 12 | 13 |
| Temp. in ° *F.* | *54* | *55* | *54* | *54* | *55* | *55* | *55* | *55* | *55* | *55* | *54* | *55* |
| Rainfall in inches. | 3·2 | 3·9 | 4·8 | 7·0 | 4·6 | 1·5 | 1·1 | 2·2 | 2·6 | 3·9 | 4·0 | 3·6 |

Rainfall varies from over 100 in. to less than 20 in., according to position, but the yearly average for most of the basins is about 45 in. The climate of the Highlands of Ecuador is much more pleasant than that experienced on the plateaux of Peru and Bolivia. The vegetation varies between forested slopes and mixed grass and woodland.

PRODUCTS. The Highlands of Ecuador contribute little to the exports of the country. Each basin has a fairly dense population of Indians who graze cattle and grow crops such as wheat, maize, beans, potatoes, barley, and vegetables. Unlike the Peruvian and Bolivian plateaux, the Highlands of Ecuador produce no minerals.

TOWNS. *Quito* (385,000) is the capital and seat of Government. Many descendants of the Spanish conquerors live here and form a leisured upper class, or are Government officials. Quito offers a great contrast to busy Guayaquil with its more progressive traders and merchants, and its commercial activity. Although Quito is connected by rail and road with Guayaquil it suffers from isolation from other parts of the country.

### The Interior Lowlands or Oriente

The interior lowlands are hot, wet plains drained to the Amazon and covered with dense equatorial forests. They are an undeveloped region remote from the rest of Ecuador and inhabited by primitive Indian tribes. A large part of the interior lowlands are claimed by Peru, but even that part which is indisputably part of Ecuador has so far contributed little to the economy of the country. Boring has proved the existence of oilfields at Mera and further east, but these areas have to be supplied by air and must await development.

### Trade

The export trade of Ecuador is confined to the products of the coastal area. Bananas are the most important export, followed by coffee, cocoa, and rice. Its principal customer is the United States.

Imports include textiles, machinery, foodstuffs, and manufactured goods.

## COLOMBIA

Colombia is in the north-west of South America. It is roughly four times the size of the British Isles and has a population of seventeen million. Negroes, mulattoes, Indians and mestizos make up about 80 per cent. of the population; the remainder are of white origin.

## Surface Features

The surface features of Colombia are very varied, including low plains, high snowy mountains, volcanic peaks, and intermont valleys and basins at different altitudes. The country may be divided into the following natural regions:—

(*a*) The Highlands.
(*b*) The Caribbean Coastal Area.
(*c*) The Pacific Coastal Area.
(*d*) The Interior Lowlands.

## The Highlands

In Colombia the Andean mountain system is deeply dissected by northward flowing rivers, such as the Magdalena, Cauca, and Atrato. Thus the Highlands are cut into four ranges which spread out towards the north. The coastal range which stretches north of Buenaventura is the most westerly. Although it only reaches about 6,000 ft in altitude, it forms some of the most rugged country in Colombia. East of the coastal range is a depression drained northwards by the Atrato and southwards by the San Juan which enters the sea near Buenaventura. From its eastern side rise the main Highlands which consist of the lofty ranges of the Western, Central, and Eastern Cordilleras. Separating the Western from the Central Cordilleras is a deep broad depression formed by a rift valley which extends from Cartago to just south of the Ecuador border. This rift is drained northwards by the Cauca, which flows in a broad, fertile valley as far as Cartago, beyond which point the river has cut its way out through deep gorges. The Patio River drains the southern end of the rift valley and escapes to the Pacific Coast by a narrow gorge through the Western Cordilleras. A pass of less than 5,000 ft altitude provides a useful outlet from the rift valley near Cali to the port of Buenaventura. The level of the rift valley varies in elevation from about 2,000 ft near Cartago to over 8,000 ft near its southern end, where it contains much fertile volcanic ash.

The Central Cordilleras are the highest and some of the snow-capped volcanic peaks tower up to more than 18,000 ft in altitude. This part of the highlands contains no important high intermont basins, but has several important settlements like Medellin (4,000 ft) in its lower valleys.

The Magdalena Valley separates the Central Cordilleras from the Eastern Cordilleras, the surface of which is very varied since it includes high mountains towering above the snow line (about 15,000 ft) and carrying glaciers, and also several intermont basins like that in which Bogota (8,560 ft) is situated. The lower slopes are deeply dissected by narrow river valleys which open out into the interior lowlands.

CLIMATES OF THE HIGHLANDS. The Colombian Highlands have a great variety of climates since altitudes vary from valley bottoms to snow-crowned mountains. In general, it may be divided into the climatic zones, which are given below:—

| | ZONES | ALTITUDE | AVERAGE TEMPERATURE | VEGETATION AND MAIN PRODUCTS |
|---|---|---|---|---|
| (*a*) | Snow-covered mountains. | Above 15,000 ft | Arctic. | No vegetation. |
| (*b*) | Paramos. | 10,000-15,000 ft | Cold and windy. | Treeless pastures for sheep and goats. |
| (*c*) | Tierra Fria. | 6,000-10,000 ft | Average annual temperatures 63°-50° F. | Maize, wheat, and potatoes in the area round Bogota. |
| (*d*) | Tierra Templada. | 3,000-6,000 ft | Average annual temperatures 75°-63° F. | Main coffee zone. |
| (*e*) | Tierra Caliente. | Below 3,000 ft | Average annual temperatures 83°-75° F. | Sugar-cane, cocoa. |

Everywhere, since the region is so near the equator, the annual range of temperature is small. Bogota, with an average annual temperature of 14° C. (*58° F.*), has only about one degree difference between its hottest and coldest month.

Rainfall varies a great deal: exposed slopes may receive as much as 150 in. a year, while protected valleys like the Cauca may only get 30 in.

Vegetation changes with temperature and rainfall conditions. Luxuriant forests occur on the wetter and warmer slopes, while savanna is characteristic of many of the intermont basins in the Tierra Fria, where grasslands are interspersed with occasional trees like oak, willow, and the eucalyptus introduced from Australasia. Areas of low rainfall have drought-resisting scrub, trees being confined to the river banks.

PRODUCTS AND DEVELOPMENT. Highland Colombia is the most productive part of the country and contains the majority of the white and Indian population.

*Coffee* is the chief cash crop. It is cultivated in the Tierra Templada belt on slopes where the soil, largely composed of decayed crystalline rocks, is very favourable. Both large and small plantations produce a good-flavoured coffee much of which is exported to the U.S.A. When dried, coffee beans do not deteriorate and can therefore easily stand the long and difficult journey from the highlands to the coast (p. 249). Coffee is Colombia's most valuable export—over four-fifths of the total exports.

*Sugar-cane* is produced in the lower valleys, particularly in the rift valley through which the upper Cauca flows and in the province of Antioquia, round Medellin. There are few modern crushing mills and most of the product is consumed locally, there being only a small export.

*Cocoa* is cultivated on a small scale in the lower part of the Rift Valley in its northern part, but production does not satisfy local needs.

*Tobacco* is widely grown in many areas; it is mostly processed and used locally.

Beans, cassava, and plantains, are the main subsistence crops of the Tierra Caliente and Tierra Templada zones. Temperate crops—maize, wheat, barley, and potatoes—are grown for local needs in the Tierra Fria zone. The district round Bogota yields most of the wheat. Cattle are reared in all areas where there is grassland, but the best beef and dairy cattle come from the Bogota area. They are also reared in the Cauca Valley

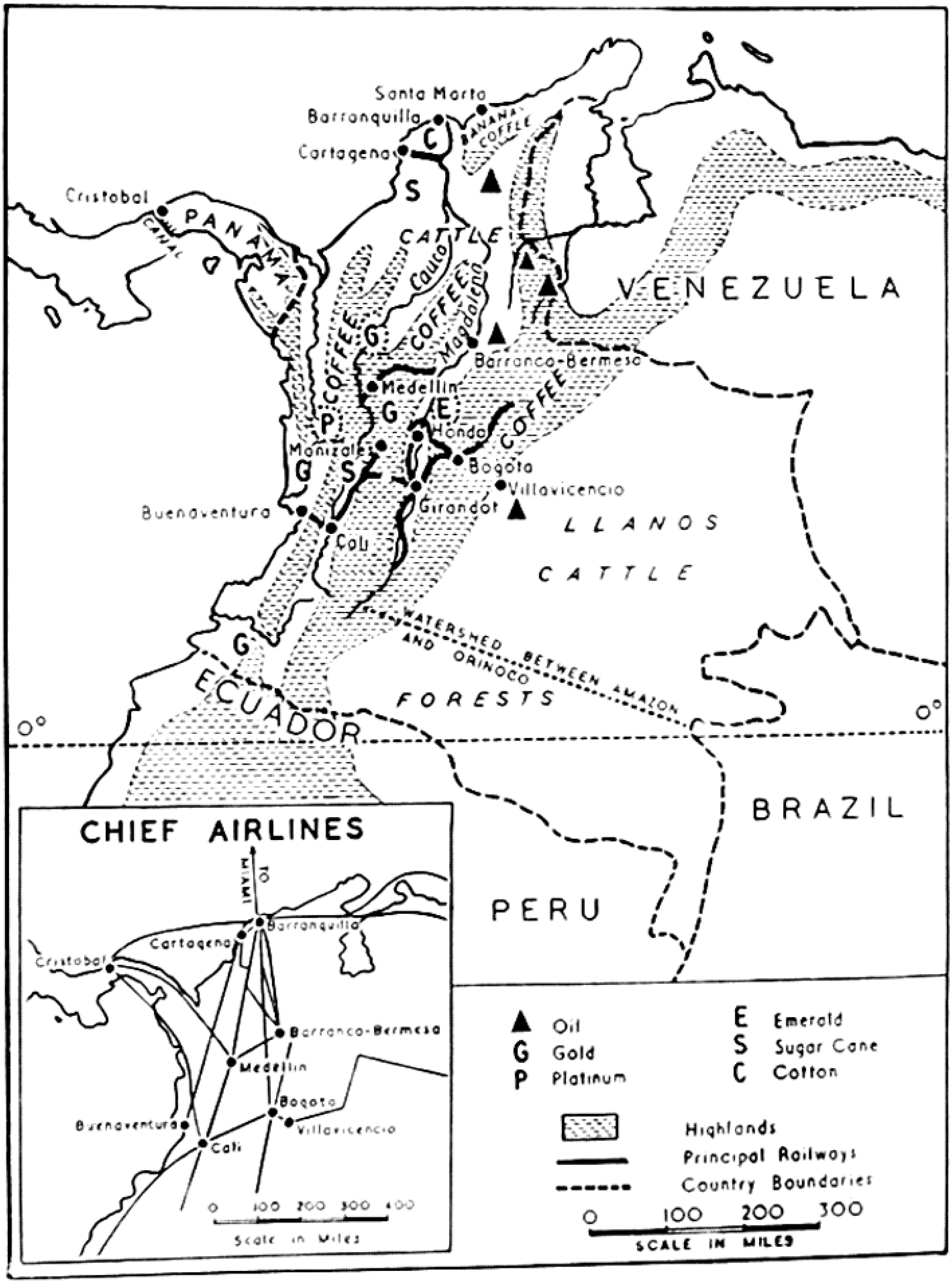


Fig. 56. COLOMBIA: ECONOMIC.

but high temperatures, frequent droughts, and diseases are serious hindrances. Hides form an item in Colombian exports.

MINERALS. One of the chief occupations of the highlands is the mining of such minerals as gold, emeralds, coal, and salt.

*Gold* is obtained from alluvial gravels by placer mining, and also from lodes. It is produced chiefly in the Western and

Central Cordilleras and in the rivers which drain from these mountains. Colombia is the leading South American producer of gold.

*Emeralds*.—Colombia is the chief source of the world's emeralds but since the demand does not always keep pace with supply, mining is not continuous. The chief producing area is near Bogota.

*Coal* occurs in many areas and is useful for industries. The chief coalfield is near Cali. Coal is also mined near Bogota, and near Medellin.

*Rock salt* is mined near Bogota and, as a Government industry, is a source of revenue for the country.

*Iron ore* is known to exist but, as yet, is little worked. The occurrence of coal, iron ore, and limestone has led to a small steel industry in the Paz de Rio district but Colombia has still to import iron and steel for its industries.

TOWNS. The highlands of Colombia contain a large proportion of its population and most of its towns.

*Bogota* (1,500,000) is the capital city. It is set amidst savanna country at an altitude of 8,650 ft above the sea, and enjoys a pleasant climate suitable for white people who form a large proportion of its inhabitants. It is the centre of cultural rather than economic life. Until the use of air transport Bogota suffered from isolation due to the long and difficult journey to the sea. There are two main ways of reaching Bogota from Barranquilla on the Caribbean Sea :—

(*a*) By air, which takes under three hours.

(*b*) By boat along the Magdalena River from Barranquilla to Puerto Berrio or Girandot and thence by rail and road to Bogota. This journey takes about six days if there are no delays.

It is possible to travel by rail and road from Bogota to the Pacific port of Buenaventura. A good motor road connecting Caracas (Venezuela) with Quito (Ecuador) passes through Bogota.

Bogota is the second manufacturing town in Colombia and is chiefly engaged in processing agricultural products—sugar refining, cigarette making, brewing, etc.

*Medellin* (780,000) lies in a valley (4,000 ft) cut in the Central Cordilleras in the progressive province of Antioquia. It is a very go-ahead town, being the chief industrial, mining, and coffee centre of Colombia. This is partly due to its energetic and business-like white inhabitants, many of whom are Jews. In its many factories food is processed and textiles, glassware, pottery, and matches, are made. A large hydro-electric plant, together with the nearby coalfield, furnishes power for its industries. Medellin's chief outlet to the sea is by rail and road to Puerto Berrio on the Magdalena, and thence by boat to Barranquilla. As with Bogota, air transport has been a valuable saving of time. Road and rail connect Medellin with Buenaventura. South of Medellin lies *Manizales*, situated in a prosperous coffee area and connected by rail with Buenaventura. In the Cauca Valley are several towns such as *Cartago* and *Cali*, each in the centre of an agricultural area. *Cali* commands the pass in the Western Cordilleras over which rail and road pass to the Pacific port of Buenaventura. It is the chief commercial and industrial town in the western Cordilleras.

## The Caribbean Coastal Area

The River Magdalena emerges from the highlands on to a broad, swampy, alluvial plain dotted with many oxbow lakes. The lowland is subject to flooding, except where occasional hills rise above the plain. Very high land, however, occurs in the north-east where the summits of the Sierra Nevada de Santa Marta rise to 19,000 ft.

CLIMATE. High temperatures throughout the year characterise the lowlands. Rainfall, which has a summer maximum with a marked dry season, decreases from about 70 in. annually in the south to under 35 in. in the north, where high evaporation, and a long, dry season, produce arid conditions. Vegetation varies with rainfall from savanna with patches of forest in the wetter south to drought-resisting plants in the arid areas on the coast.

PRODUCTS OF THE MAGDALENA LOWLANDS. The majority of the inhabitants of the lowlands are either negroes or mulattoes who are often easy-going and indolent. They do not provide an efficient source of labour.

*Cattle* are reared in many areas, and beside being used for draught animals, provide meat, milk, and cheese, for the local inhabitants, and hides for export.

*Sugar-cane* is grown on many farms, but the chief area is between Cartagena and the Magdalena. Conditions of climate and soil are good, but primitive methods are used and there are few modern crushing mills.

*Cotton* is produced in the drier areas of the north. It is obtained from a perennial bush. In many cases picking is careless and the resulting product poor.

Subsistence crops include plantains, cassava, corn, and beans. Rice is the staple food near Cartagena.

PRODUCTS OF THE SANTA MARTA AREA. This district has the best organised and most progressive plantations of the Caribbean area, and coffee and bananas are the chief crops.

*Coffee* is grown at heights between 3,000 ft and 4,000 ft along the northern slopes of the Sierra Nevada de Santa Marta. Although production is less than that of the highlands, it is, nevertheless, an important coffee-producing area.

*Bananas* are cultivated on a commercial scale at lower levels. The very high temperatures of about 27° C. (*80° F.*) favour cultivation of the fruit but irrigation is necessary to supplement the low rainfall in the dry season. The plantations are protected from strong winds such as sometimes damage the West Indian crop. A United States company owns many of the plantations. Specially equipped docks at Santa Marta are linked by rail to the growing area and deal with the export of the fruit.

MINERALS. The most important asset of the Caribbean Lowlands is petroleum, which forms the second export of Colombia. Commercial exploitation of petroleum is almost confined to the middle Magdalena about 400 miles from its mouth near Barranca-Bermeja, and to the borders of Venezuela, south-east of Lake Maracaibo (Fig. 57, p. 246). Oil is piped to Barranca-Bermeja, where there is a refinery, and is then sent by pipe-line to Cartagena for export. The oilfields which lie on the Venezuelan border are served by a pipe-line which takes the oil over the mountains to the Caribbean Coast. Petroleum is known to occur in other regions. One such area in the interior lowlands may prove important. Much of the oil production of Colombia is in the hands of American companies.

Although Colombia commenced to produce oil only in 1926, Fig. 58 shows how rapid has been the development of this industry. Petroleum now accounts for 13 per cent. of Colombian exports in value and the country now ranks next to Venezuela among the oil-producing countries in South America.

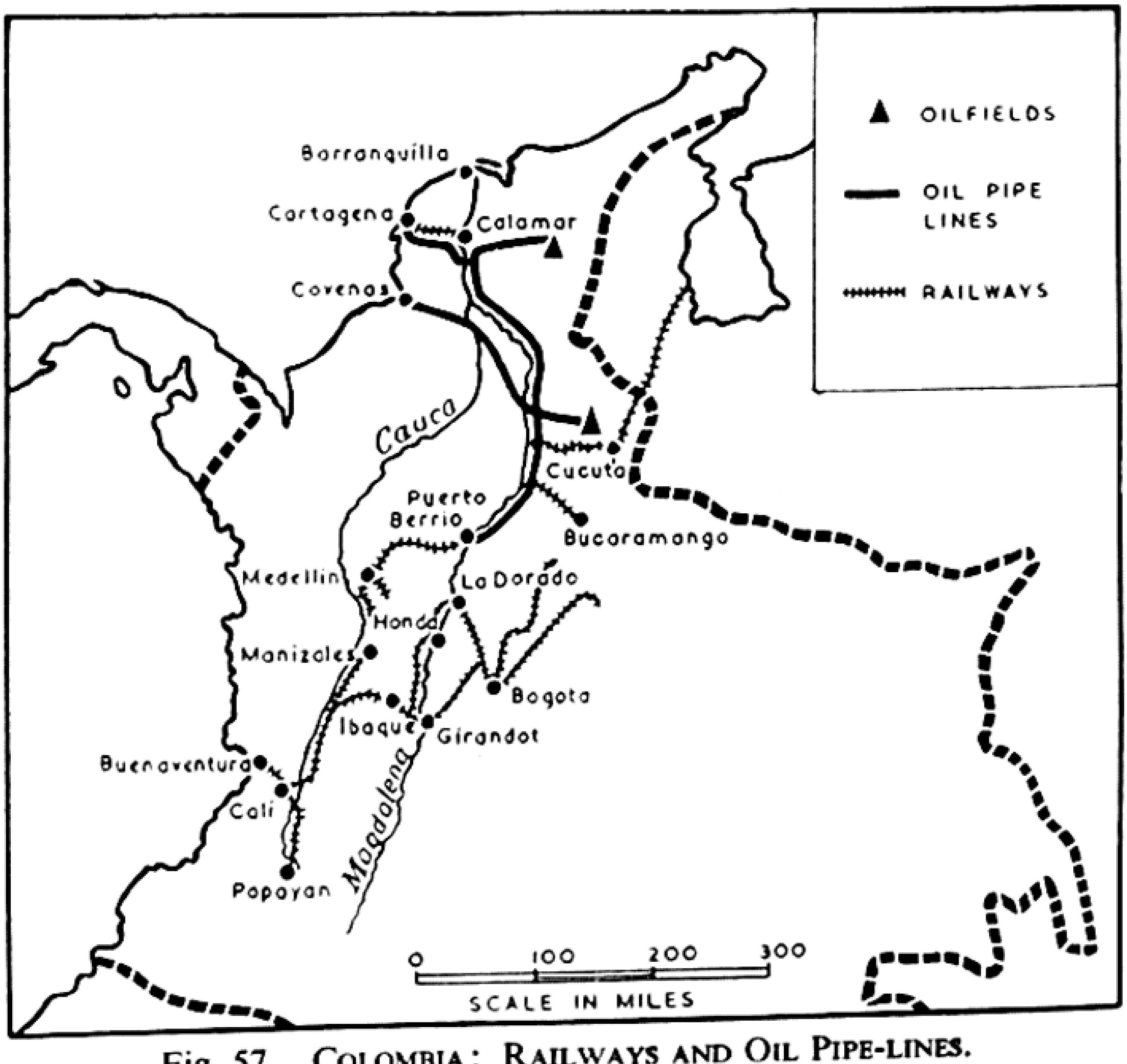


Fig. 57. Colombia: Railways and Oil Pipe-lines.

Towns of the Caribbean Area. *Cartagena* (200,000) was an important port in the Spanish colonial period. It is situated on a protected harbour and connected by a natural canal—the El Dique—with the Magdalena. A railway also connects Cartagena with Calamar, a river port on the

Magdalena. It exports oil, and also serves the Atrato Valley, collecting the gold and platinum obtained in that region.

*Barranquilla* (525,000) is the leading seaport of Colombia and has an international airport. Goods of many kinds are brought down the Magdalena River, which is navigable for 900 miles, for export from Barranquilla. The channel has been deepened near, the port which not only serves the Magdalena Valley but also the highlands. Barranquilla is the chief coffee-exporting port in Colombia.

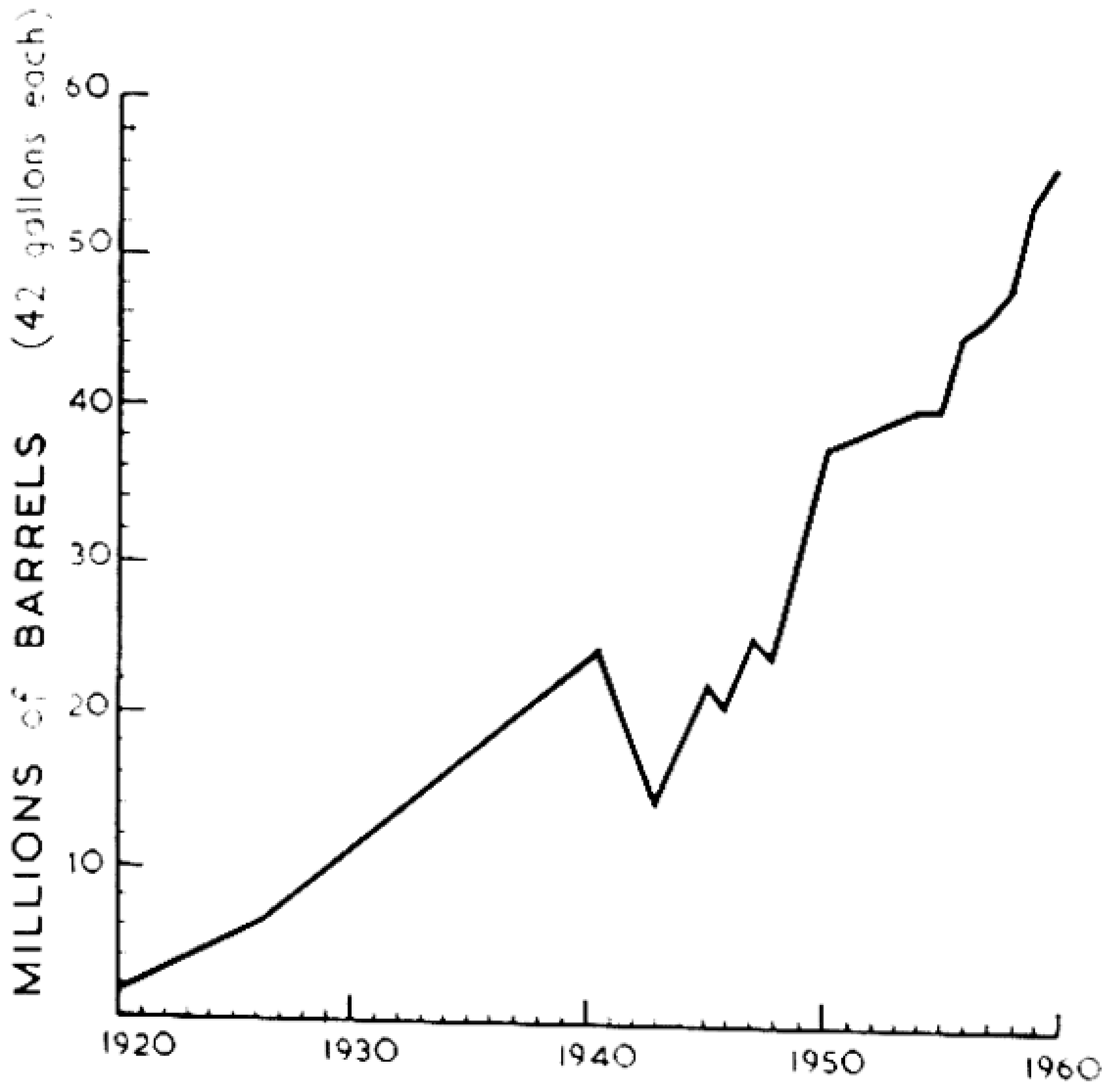


Fig. 58. Graph showing Rise in Oil Production in Colombia.

*Santa Marta* has a good harbour for shallow-draught boats and has increased in importance since it has handled the export of bananas grown in its hinterland.

## The Pacific Coastal Area and the Atrato Valley

Surface Features. North of Buenaventura there is only a narrow coastal plain flanked by the coastal mountains. Southwards, the coast is fringed by low, deltaic flats formed by numerous streams which drain to the Pacific Ocean.

Behind the coastal mountains is a broad, low, alluvial valley drained northwards by the Atrato, and southwards by the San Juan.

CLIMATE AND NATURAL VEGETATION. The climate of the coastal lowlands is equatorial—hot throughout the year—with a heavy rainfall of over 80 in. An annual rainfall of over 300 in. has been recorded in some areas. The heat and high humidity make it unattractive to white settlers, and the principal inhabitants are negroes. Luxuriant forests clothe much of the area. Many of the trees are hardwoods and palms, while bamboo thickets supply material for negro homes. The forest is but little exploited, the principal wild products being taqua nuts and balata rubber, which are obtained from the more accessible regions near the coast. There are few plantations of economic value. Rubber is cultivated in the Atrato Valley on a small scale, and small quantities of cocoa and sugar are grown on plantations. Food crops include bananas, mangoes, sugar, and maize.

MINERALS. Gold and platinum occur in most of the river deposits in the area. The chief mining districts are in the Atrato Valley where electric dredges are used as well as primitive native methods of washing. Colombia is the second world source of platinum.

TOWNS. *Buenaventura* (110,000) is one of the few Pacific ports where natural, deep water for ships reaches the coast. Its importance has been increased since the opening of the Panama Canal, and the building of railways and roads to connect the town with the Cauca Valley and Highland Colombia. It is now the second port of Colombia and deals with the export of gold, platinum, sugar, cocoa, hides, and forest products such as tagua nuts and balata rubber.

## The Interior Lowlands

The interior lowlands occupy nearly half of Colombia. They are of little economic importance since they are isolated from the rest of Colombia and the outside world by lack of transport. The northern part of the area, which is drained to the Orinoco, consists chiefly of grasslands known as llanos. Here low-grade cattle are reared, but remoteness from markets makes non-perishable hides the main item of trade. Southward, the llanos pass into forests which occupy most of the land which is drained to the Amazon. The forests yield little but balata rubber which is gathered by roving Indians. The interior lowlands are sparsely populated, chiefly by Indian tribes. Petroleum has been located in the llanos near Villavicencio (Fig. 56, p. 242), and may prove important in the future if transport difficulties can be overcome.

### Transport in Colombia

The surface relief makes transport very difficult and hinders the development of the country. The chief natural highway is the Magdalena, which connects Highland Colombia with the Caribbean Coast and even this river is unsatisfactory; seasonal fluctuations in water level, and shifting sand-banks prevent the passage of anything but boats of shallow draught, and even these may be marooned. Transport is halted by rapids near Honda (615 miles from the river mouth) and goods have to be transferred to a short railway which takes them to a point beyond the rapids from whence steamers may travel to Girandot, the river terminus of the railway to Bogota. The Magdalena thus affords a slow means of transport and goods may take as much as six months to travel from the capital to the coast by this route.

There are some good motor roads, but many more are needed. No real railway system exists. There is a series of short lines, often interrupted by change of gauge, and giving little through communication.

Air lines link most of the towns and have been of great value in solving transport difficulties for passengers and light goods, but bulky exports still have to travel by slower routes.

### Trade

Coffee is the chief product in Colombia's trade and about three-quarters of all her exports. Petroleum is second in importance.

Other exports include bananas, tobacco, sugar, and platinum. The United States is the chief buyer of all these products, and also provides most of the imports, which include machinery, motor cars, metal goods, textiles, and chemicals.

Recently trade has declined because of political unrest in the country which has a rapidly increasing population and a high level of unemployment. The economic situation is not likely to improve until a stable government is established.

# CHAPTER XV

## VENEZUELA AND THE GUIANAS

### VENEZUELA

Venezuela is a Republic about three times the size of the British Isles. The Spanish conquerors, who saw Indian villages built on piles in the shallow Lake Maracaibo, named the country "Little Venice", or Venezuela. The population of nine million is a mixed one, mainly of mestizos. Europeans and those mainly of white descent are concentrated in the towns and form the leaders of political and economic life. Many negroes live on the Caribbean coast and in the Maracaibo Lowlands. Pure Indians, descendants of the Incas, are chiefly confined to the Guiana Highlands. The population is increasing steadily so that there is a serious housing shortage and some unemployment.

#### Surface Features

The Eastern Cordilleras of the Colombian Andes stretch into Venezuela and split up into two ranges which encircle the Maracaibo Lowlands. The most easterly range trends north-eastward as the Merida and Segovia Highlands. It reaches the coast west of Puerto Cabello whence, turning eastward, it runs parallel to the Caribbean Coast as the Northern, or Caracas, Highlands. South of the Northern Highlands lies the Orinoco Basin which is flanked in the south-east by the Guiana Highlands.

Venezuela may be divided into the following regions:—

(*a*) The Northern, Segovia, and Merida Highlands.

(*b*) The Maracaibo Lowlands.

(*c*) The Orinoco Basin, or Llanos.

(*d*) The Guiana Highlands.

#### The Northern Highlands

From the Caribbean Coast, mountains rise abruptly to between 6,000 ft and 9,000 ft and form a tract of high country broken by a wide gap south of Barcelona. These highlands consist of two ranges enclosing intermont basins, and broken by several river valleys. Over half the people of Venezuela live in the Northern Highlands which are the centre of cultural, political, and economic life.

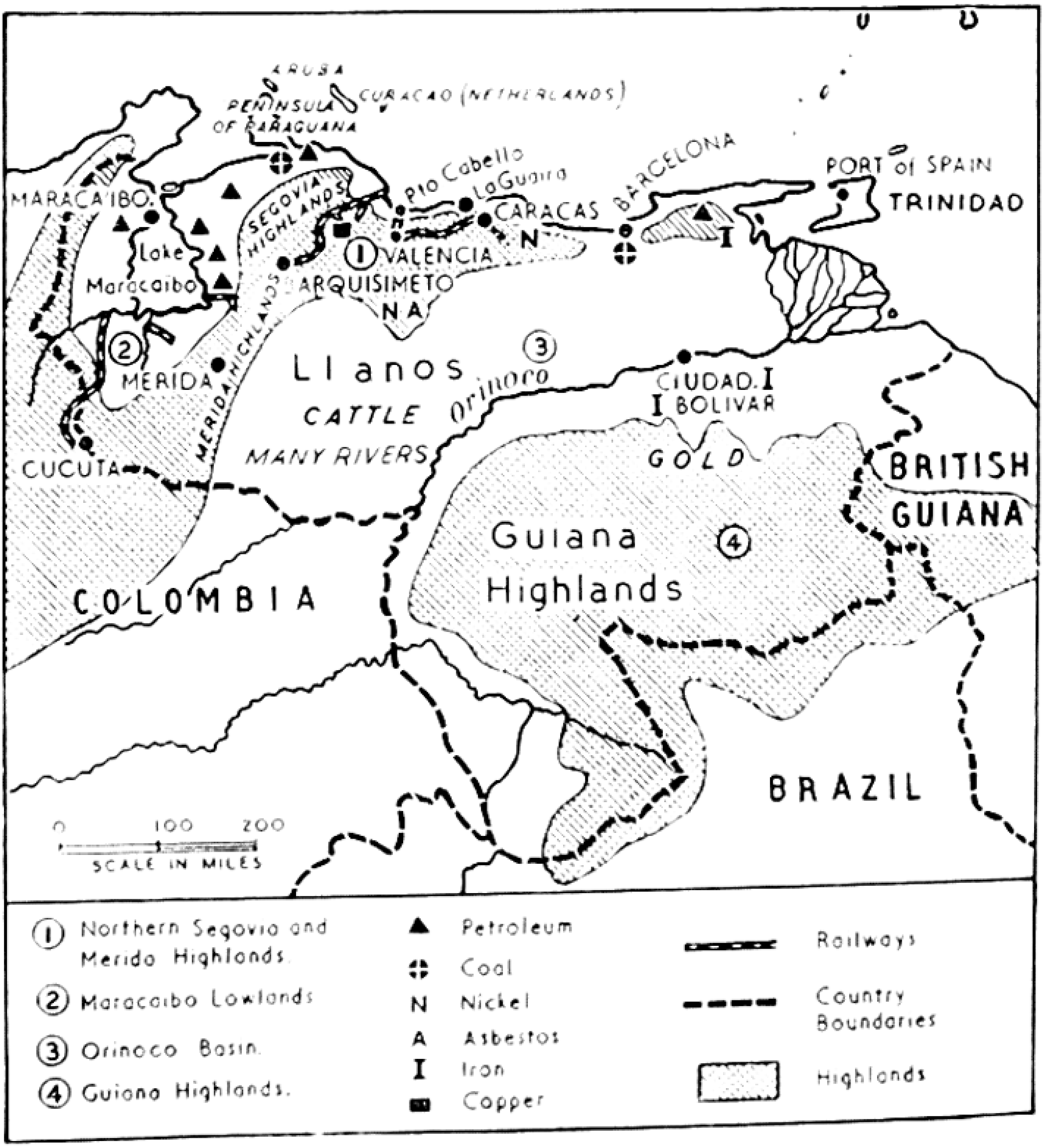


Fig. 59. VENEZUELA.

The northern coast is very dry (La Guaira has an annual rainfall of 11 in.), but the higher slopes of the mountains receive a more adequate rainfall. Temperatures vary with altitude. In general, the climate of the Northern Highlands is very pleasant and attractive for settlement.

The following are the average temperature and rainfall figures for Caracas which is 3,415 ft above sea level:—

| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Temp. in °C. | 20 | 21 | 21 | 22 | 23 | 23 | 22 | 23 | 22 | 22 | 22 | 21 |
| Temp. in °*F.* | *68* | *69* | *69* | *72* | *74* | *73* | *72* | *73* | *72* | *71* | *71* | *69* |
| Rainfall in inches. | 0·9 | 0·3 | 0·6 | 1·2 | 2·8 | 4·0 | 4·8 | 3·8 | 4·2 | 4·4 | 3·3 | 1·6 |

The wetter slopes of the mountains are forested but much of the land in the basins is covered with mixed grass and woodland of a savanna type.

AGRICULTURAL PRODUCTS. The basin in which Valencia is situated is the chief agricultural area but most of the gentler slopes and valleys are cultivated.

*Coffee* is still the chief export crop of Venezuela, although production has recently declined. In the Northern Highlands it is grown on slopes, too steep to plough, at between 1,500 ft and 3,000 ft above sea level. Venezuelan coffee commands high prices because of its superior flavour.

*Cocoa* is cultivated in the wetter valleys and on the northward-facing slopes of the coastal range.

*Sugar-cane* is the chief crop of the Valencia Basin and is grown for home consumption. *Cotton* is also grown in this area for use in the textile mills of Valencia and Caracas. Tobacco is another crop. Maize, rice, manioc, beans, and bananas are grown for food.

The rich pastures of the Valencia Basin provide fodder to fatten cattle brought from the llanos (p. 257) prior to being converted to beef. There are also some dairy cattle in this area.

### The Merida and Segovia Highlands

These mountains are higher than the Northern Highlands and rise above the snow line to about 16,000 ft. They contain several intermont basins.

Owing to the range of altitude, all climate belts from the Tierra Caliente (p. 240) to the Paramos are represented. Rainfall decreases towards the north, the Segovia Highlands having a very small rainfall. In the Merida Highlands there are two distinct rainy seasons which give an adequate rainfall. Only the mountainous character of the country and its inaccessibility limit agriculture. Natural vegetation varies from forest in the wetter areas to scrub in the dry Segovia Highlands. It also varies with altitude.

AGRICULTURAL PRODUCTS. The Merida Highlands are the chief coffee-growing area in Venezuela. It is cultivated in the Tierra Templada zone between 3,000 ft and 6,000 ft above sea level. Much of the crop is exported by mule from the mountains to the short railway lines (Fig. 59) which take it to navigable streams down which it is transported to Lake Maracaibo. This route often takes a long time and is being challenged by the longer route along the trans-Andean Highway, a good motor road (see p. 259) to Valencia, and thence by road or rail to Puerto Cabello.

Cocoa is the next important money crop. It is cultivated in the wetter area below 3,000 ft.

Maize, which is the chief food crop, can be grown at all altitudes up to 7,500 ft. Other crops range from tropical products, such as bananas and manioc, to temperate crops such as wheat and barley.

MINERALS OF THE NORTHERN AND SEGOVIA HIGHLANDS. Apart from oil (p. 256), Venezuela has little mineral development. Medium-grade coal occurs in a few areas (Fig. 59) and is used for industry at Caracas and Valencia. Nickel has recently been discovered in the Northern Highlands and is being developed, but copper mines near Barquisimeto have now ceased production. Other minerals which await development are asbestos and mercury. High-grade iron ore is worked and is exported in considerable quantities to the U.S.A. though Venezuela also has its own steel industry.

CHIEF TOWNS OF THE NORTHERN, MERIDA, AND SEGOVIA, HIGHLANDS. *Caracas* (1,500,000) is the capital of Venezuela. It lies in a fertile agricultural basin about 3,000 ft above sea level. Caracas is linked with its port, La Guaira, by railway and by a fine highway with six traffic lanes which tunnels through mountains and crosses large concrete bridges spanning deep ravines. Caracas has no natural outlets southwards but it is connected by road with the llanos and with the Merida

Highlands. Road and railway link the town with Valencia. Caracas is the chief manufacturing centre of Venezuela with factories making textiles, cigarettes, and various food products. The city is prosperous with wide streets and modern buildings but is encircled by a suburban slum area of shanties and shacks (see opposite p. 229).

*La Guaira* (16,000) is the chief port of Venezuela. It has a fine modern harbour through which passes most of the trade of the Caracas area.

*Puerto Cabello* (34,000), Venezuela's second port, serves the Valencia Basin. It has grown in importance since the building of the trans-Andean Highway made it possible to export coffee from the Merida Highlands.

*Valencia* (204,000) lies in a fertile basin about 1,500 ft above the sea, and is connected by a pass through the coastal range with its port—Puerto Cabello. Road and rail run to the coast and there is a good road to the Merida Highlands. Valencia is an important industrial centre making textiles, refining sugar, and processing food and tobacco.

Other important inland towns are *Barquisimeto* (235,000), in a sugar-growing district of the Segovia Highlands, and *San Cristobal* (130,000), in the Merida Highlands.

### The Maracaibo Lowlands

The Maracaibo Lowlands are surrounded by high mountains from which streams flow over marshy ground to the shallow, freshwater lake of Maracaibo.

Much of the area suffers from high temperatures and high humidity. Maracaibo has an average annual temperature of 28° C. (*82·4° F.*). The climate is enervating and not attractive to white settlers. Rainfall decreases from over 50 in. in the south to almost none in the extreme north. There are two rainy seasons—May to July, and September to November; the longest dry period is in the winter.

Vegetation varies with rainfall from rain forests in the south, through savanna, to drought-resisting scrub in the north.

FOREST PRODUCTS. Various hardwoods, including mahogany, are felled in the forests, trimmed into blocks, and floated down the streams and lake to Maracaibo City, the chief lumber centre.

AGRICULTURAL AND PASTORAL PRODUCTS. In the more open areas of the lowlands, large estates produce crops of inferior or medium quality. This is partly due to inefficient labour drawn from the negroes and poorer types of mestizos. These people are usually illiterate and the enervating climate makes manual work difficult. Moreover, the estates are mainly owned by absentee landlords who take little interest in them apart from the money derived from the sale of produce.

*Cocoa* and *sugar-cane* are the chief plantation crops in the wetter areas. Although the natural conditions of high humidity and high temperatures favour the growth of cocoa, poor methods of cultivation, disease, and slow transport to market—which may cause the beans to deteriorate en route—result in a product of only medium quality. There is, however, some export trade.

*Sugar* cultivation also tends to be careless and most of the crop is consumed locally.

*Cotton* is grown in the drier, northern districts but the fibre is often poor and unfit for export.

*Coconuts* grow along the shores of Lake Maracaibo, in both small and large plantations. They require little attention and the production of coconut oil and copra is increasing.

Other crops include bananas, manioc, and breadfruit—all used locally for food.

In many areas cattle are reared on large estates where there are natural grasslands which provide good pasture in the rainy season. Fodder in the dry season is, however, scant, and disease prevents the breeding of any but the poorest types of animal. These furnish meat for local consumption, and some cheese is made. Hides are exported. On the dry, northern pastures goats are the characteristic animals.

To sum up—the full agricultural development of the Maracaibo Lowlands is hindered by the hot, humid climate and by inadequate supplies of labour. Work on the land is poorly paid and many workers migrate hoping to earn higher wages in the oilfields or the towns. Unfortunately, many end up without jobs and live in miserable shanty towns.

PETROLEUM. Oil accounts for 92 per cent. of Venezuela's export trade. Much of the development is done by British, Dutch, and American companies, but half the profits from these remain in Venezuela. Most of the oil is obtained from the eastern shores of Lake Maracaibo and below the lake itself, although there are a few other oil-bearing localities (see Fig. 59). Much of the Maracaibo oil is taken in shallow-draught tankers to refineries on the islands of Aruba and Curaçao in the Netherlands Antilles, or to those in the Paraguana Peninsula. Oil has transformed Venezuela from a relatively insignificant producer of hides and tropical products to one of the world's leading producers of petroleum. It has also been responsible for the rapid rise of Maracaibo City. Output of oil is still increasing and natural gas is piped 180 miles from La Paz oilfield to the Paraguana oil-refineries.

*Maracaibo City* (458,000), on the northern, narrow entrance to Lake Maracaibo, is the main centre for the oil industry. It is a port, twenty miles from the open sea, and is used by ocean-going tankers. It is also the chief coffee port of Venezuela, serving the growing areas of the Merida Highlands, and is the only important town in the Maracaibo Lowlands.

*Puerto Miranda* is a new oil port on the eastern shore of the entrance to Lake Maracaibo.

### The Llanos of the Orinoco Basin

The Orinoco Llanos consist of a large, almost featureless, plain which lies between the North-Eastern Highlands and the Orinoco River. The Orinoco and its tributaries form the chief highways of the region; over 1,500 miles of these waterways are navigable for shallow-draught boats.

The Orinoco Llanos have a marked rainy season followed by a dry season, the rains falling during the summer (May to October). The rainfall is so heavy that the rivers often flood. The natural vegetation consists of grass with patches of scrub bush.

*Cattle rearing* has been the chief occupation of the llanos since colonial days. Insect pests have always been a hindrance to both man and beast but a hardier type of cattle—cross-bred between the European breeds introduced by the Spanish conquerors and the Indian Zebu cattle—has now been introduced. The cattle are reared chiefly on large unfenced estates. During the floods they are forced to move to the islands of higher land on the watersheds between the streams, so their feeding grounds are restricted. After the floods, pastures are good but lack of rain soon results in brown, dry pastures which have little value. Only on the more progressive estates, near the foot of the Andes, is irrigated fodder grown for use in the dry season.

When the cattle are ready for market many of them are driven to fattening pastures in the Northern Highlands, particularly those in the Valencia Basin (p. 255). When in good condition they are killed for beef. Other cattle are taken by boat down the Orinoco where there is a regular steamship service from Ciudad Bolivar to Port of Spain in Trinidad. Surplus meat and cattle find a market in the West Indies and the Guianas. The beef is inferior in quality to that of the pampas (pp. 193-5).

In spite of the difficulties, cattle rearing on the llanos is very important and many of the richest men in Venezuela have made their money in cattle. Although agriculture is little developed, subsistence crops of corn, manioc, fruit, and vegetables, are grown on some estates. The collecting of the plumes dropped by egrets when these birds moult is a minor industry.

At the mouth of the Orinoco there is a delta with many watercourses. It is covered with dense forest and inhabited by Indian tribes living on fish, and on crops of corn and manioc cultivated on patches of cleared land. There is no port on the Orinoco delta.

Rich iron ore deposits are found near Cuidad Bolivar. Much ore is exported to the U.S.A. from specially equipped small ports on the Orinoco. A Government steel works at Puerto Ordaz at the confluence of the Orinoco and Caroni rivers uses local ores. It obtains power from a hydro-electric plant on the Caroni.

A number of oilfields exist in the Orinoco Basin, north of the river, but they are not economical to exploit.

TOWNS. *Ciudad Bolivar* (90,000) is the only town of importance. It lies 250 miles from the mouth of the Orinoco and is built on a hill above flood level. It is at the head of navigation for steamers. Its chief exports include live cattle, hides, and egret plumes, from the llanos; gold, chicle, and balata rubber, from the Guiana Highlands.

### The Guiana Highlands

The Guiana Highlands consist of a little-explored mountainous region mainly below 2,000 ft, although the flat tableland of Mount Roraima rises to over 8,000 ft. The region is dissected by river valleys. The climate is generally hot, wet, and unhealthy. Much of the area is clothed in forest which thins out in places to savanna. Tribal Indians are the chief inhabitants.

The remoteness of this region and the difficulties of access have hindered development. The chief exports are wild forest products and minerals. Balata rubber, used in making golf balls, and chicle—used in the U.S.A. for making chewing gum—are collected for export. The Guiana Highlands are known to be rich in minerals and river gravels have been panned for gold and diamonds for many years. There is also some lode mining of gold by foreign companies but the difficulty of bringing in mining equipment, and the unhealthy climate, have held back development.

### Transport in Venezuela

Railways are few and are limited to the linking of cities in the Northern Highlands, and to a few short lines which link the Merida Highlands with the Maracaibo Lowlands. Even these few railways are complicated by different gauges; in fact, the railway system is obviously that of a country in its early stages of economic development.

Although road building was important in the policy of President Gomez (1922-29 and 1931-35), who did much to develop his country, the transport system is still inadequate. There are no good roads in the llanos. The most important road is the trans-Andean Highway which links the northern cities with the Merida Highlands and Colombia. Good roads also connect the principal towns of the Northern Highlands.

Air transport is of vital importance and is increasing. There are some forty airports in the country and more are planned. The chief routes connect the northern towns with Barranquilla and Port of Spain from which there are regular services to the U.S.A. Another air route links the northern towns with Ciudad Bolivar and the chief diamond mines of the Guiana Highlands.

### Industry and Trade

There are few manufactures and these are insufficient to meet domestic needs. They include soap, paper, cement, and textiles.

Most of Venezuela's trade is with the U.S.A. Oil and its products make up by far the largest element, accounting for over 90 per cent. of the total. Other exports are iron ore, coffee, cocoa, gold, timber, and hides.

Imports include machinery, foodstuffs, iron and steel, chemicals, textiles, and electrical goods. More than half are supplied by the U.S.A. and Venezuela is Britain's second best customer in Latin America.

## THE GUIANAS

British and French Guiana lie on the north-east coast of South America. In 1961, British Guiana (population 625,000) was granted internal self-government. The former colony of Dutch Guiana or Surinam which lies between them is also self-governing and is regarded as now an equal partner in the Netherlands Kingdom. It has a population of 340,000.

Except near the coast the Guianas are sparsely peopled. The population is very mixed and consists of a few whites, chiefly in administrative and commercial posts, many negroes, many Asiatics from South-East Asia, some Chinese, and many people of mixed descent. Most of the Asiatics were brought in to work as labourers on the coastal plantations, and continue to do so. Their numbers are increasing rapidly. Already there are 300,000 East Indians in British Guiana out of a total population of 625,000. In the remote highlands and the equatorial forests most of the inhabitants are native Amer-Indians. A small number of bush negroes who have descended from freed negro slaves and reverted to a primitive life also live in the forests.

**Surface Features**

The Guianas have a coastal plain ten to thirty miles wide which in many places is below sea level. At high tide, large areas are invaded by the sea and when the rains are heaviest the water has to remain on the land in shallow lagoons until the tide falls.

Inland there are rising uplands which eventually end in the Guiana Highlands. These are composed partly of crystalline rocks which form hilly upland areas, and partly of massive sandstones which lie in horizontal beds and form high plateaux from which rivers tumble in majestic waterfalls. These sandstone plateaux rise to over 8,000 ft in Mount Roraima, but much of the Highlands area is less than 4,000 ft above the sea.

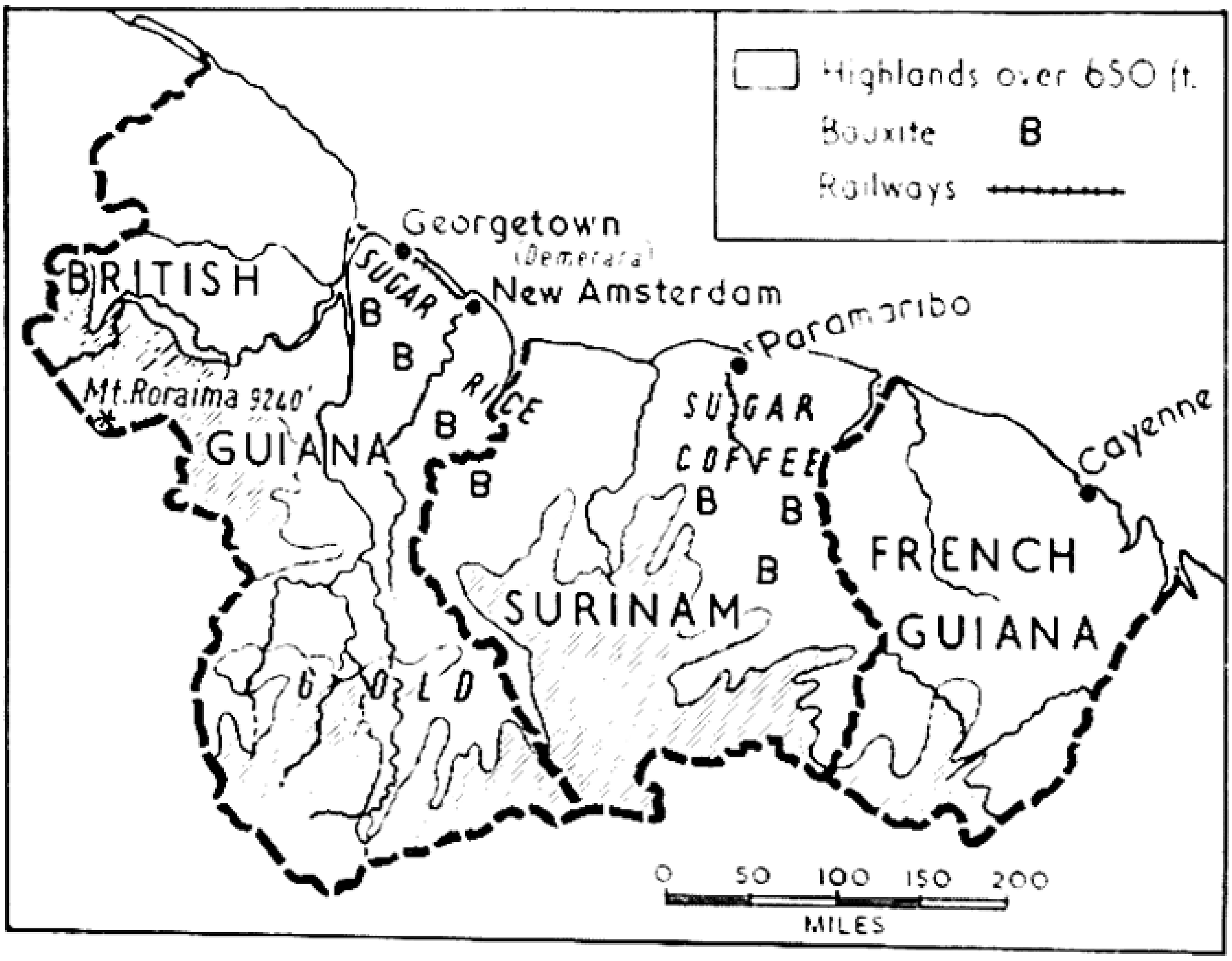


Fig. 60. The Guianas.

Many rivers rise in the Guiana Highlands and their courses are interrupted by frequent rapids and falls. Only short stretches of water are navigable, and since the rivers afford the main means of penetrating the highlands, vast areas are therefore little known.

## Climate and Natural Vegetation

The Guianas have everywhere an equatorial climate with average annual temperatures of about 80° F. except in the highest parts. The annual range of temperature is very small. Rainfall, which is spread throughout the year, is high, with two periods of maximum precipitation. The following figures are for Georgetown in British Guiana:—

| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Temp. in °C. | 26 | 26 | 26 | 27 | 26 | 26 | 26 | 27 | 27 | 27 | 27 | 26 |
| Temp. in ° *F.* | *78* | *78* | *79* | *80* | *79* | *79* | *79* | *80* | *81* | *81* | *80* | *79* |
| Rainfall in inches. | 7·6 | 5·7 | 5·7 | 6·5 | 10·9 | 12·0 | 9·7 | 6·7 | 2·7 | 2·4 | 5·7 | 11·3 |

Most of the country is covered by tropical rain forests. Marshes and wet savanna are typical of the coastal plain, and there is dry savanna country on the sandstone plateaux.

## Agriculture

Agriculture is limited to the coastal plain, and even here British Guiana and Surinam are more developed than French Guiana.

Before cultivation is possible, the swampy, coastal lowlands have to be drained. In this work the Dutch were the pioneers for they had intimate knowledge of the problems to be faced from experience in their own country. In British Guiana some areas which were subject to flooding have been reclaimed for rice-growing. Rice is increasing in importance throughout the Guianas and is a staple food. British Guiana is one of the chief rice-growing countries in South America and exports a surplus to the West Indies.

Sugar-cane is the leading crop in British Guiana and nearly one-third of the people in the colony depend on it for a livelihood. Most of the plantation work is done by Indians; the negroes take more readily to town life. Sugar production in Surinam has decreased. Coffee in Surinam, and coconuts in British Guiana, are also important. Recently the production of citrus fruits has increased. Small amounts of plantation rubber are exported from British Guiana. Other crops include cocoa, and food crops such as yams, manioc, and maize. A few inferior cattle are reared on the wet savannas.

French Guiana has plantations of sugar, bananas, coffee, and cocoa, mainly for local consumption.

### Forest Products

These include balata rubber and timber which are exported in small amounts. Lack of transport makes timber extraction difficult and it is only possible to exploit the fringes of the vast forested areas. The greenheart timber of British Guiana is a hardwood of particular value to marine engineers for constructing harbours and quays.

### Minerals

The most important mineral is bauxite from which aluminium is obtained. It is formed by the weathering of crystalline rocks which, under wet, tropical conditions, disintegrate into a red earth, rich in aluminium oxide. The workings occur in British Guiana and Surinam, and from these sources the U.S.A. derives over 90 per cent. of its imported bauxite. In Surinam the deposits are very extensive and provide four-fifths of the exports. An aluminium smelter uses hydro-electricity from the swift Surinam River at Brokopondo, about sixty miles from the coast. Gold and diamonds are obtained from stream gravels in the Guiana Highlands. Gold mining is the most important industry of French Guiana; manganese is mined in British Guiana.

### Chief Towns

*Georgetown* (165,000), the capital and chief port of British Guiana has a mainly negro population. In recent years it has suffered from periods of industrial unrest.

*Paramaribo* (125,000) is the chief port of Surinam.

*Cayenne* (19,000), the capital of French Guiana, also a port, is less important.

### Trade

Although British Guiana and Surinam are most developed, all the Guiana countries are backward. Lack of land transport, which is limited to a few good roads and only a short mileage of railway, has made access to the interior difficult. The aeroplane is mainly used for this purpose. Agriculture is therefore limited to the coastal plain where most people live.

Sugar and bauxite account for more than half the exports of British Guiana, with some rice, timber, diamonds, manganese, and rum. Most of the trade is with Britain, Canada, and the U.S.A.

The chief export of Surinam is bauxite, with some timber, rice, citrus fruit, and coffee. Surinam has a considerable trade with Britain. The chief export of French Guiana is gold.

# CHAPTER XVI

## AUSTRALIA: INTRODUCTORY

Australia lies between the Indian and Pacific Oceans and stretches from longitude 114° E. to 154° E., roughly 2,400 miles. It is twenty-five times as large as Britain and nearly one-half lies within the tropics.

### Relief Divisions

Physically, Australia may be divided into three parts:—

(i) The Western Plateau which occupies the western half of the continent.

(ii) The Central Basin which lies in part below sea level.

(iii) The Eastern Highlands, a belt of fold mountains running parallel with the east coast, and seldom extending more than 100 miles inland.

THE WESTERN PLATEAU is composed of sandstone and limestone strata which lie in roughly horizontal layers over igneous rocks. It is undulating, with an average height of about 1,000 ft, but is much higher in places where isolated mountain ranges of harder rock rise above the general level. The Hamersley Range, for example, rises to over 4,000 ft in Mount Bruce; Mount Woodroffe in the Musgrave Range is over 5,000 ft above sea level. The Macdonnell and James Ranges in the centre of Australia rise to over 3,000 ft. In places where the sandstone rocks have crumbled, as a result of very hot days followed by very cold nights, the plateau is covered by deep sand-dunes.

In general, the Western Plateau drops steeply to the sea, giving rise to an even coastline with few inlets, except in the north-east. Here the sea is shallower and there are good harbours with high tides—Darwin, Wyndham, and Derby, for example.

THE CENTRAL PLAINS extend from Encounter Bay in the south to the Gulf of Carpentaria (which is no more than a shallow depression covered by the sea) in the north. They may be divided into three main parts:—

(i) The Murray-Darling Basin or Riverina Plains.
(ii) The Lake Eyre Basin.
(iii) The Carpentaria Lowlands which drain into the Gulf of Carpentaria.

The Murray-Darling Basin is a rich agricultural area which depends for its prosperity on an adequate water supply. The Murray, together with its tributaries—the Darling, Murrumbidgee, Lachlan, and Goulburn, drains nearly the whole of South-Eastern Australia. Many of the rivers, especially those in the northern part of the region, dry up in the dry season and become little more than chains of waterholes. The Darling and the Murray are fed by water from the melting snow on the Southern Alps. Although the River Murray

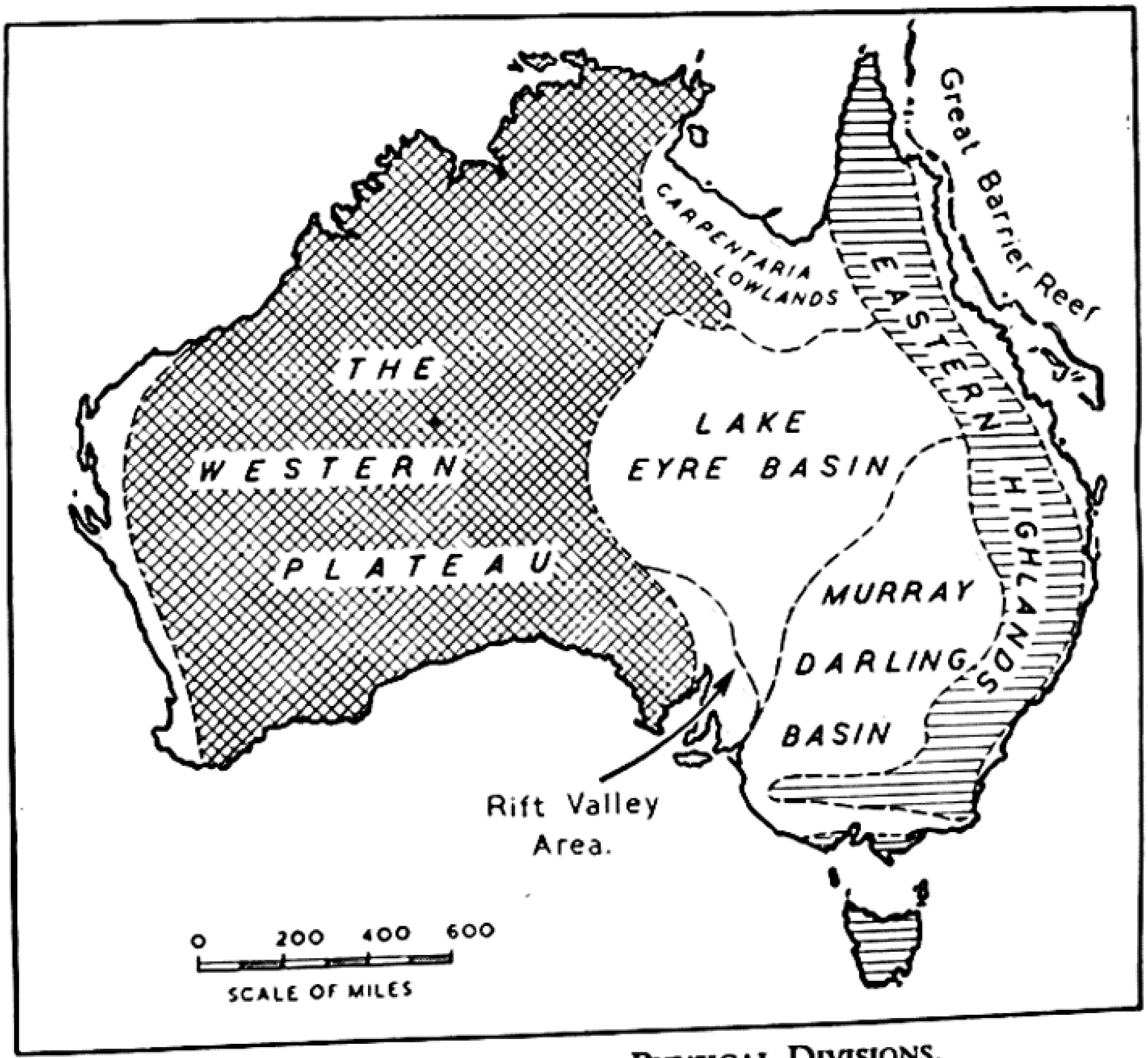


Fig. 61. AUSTRALIA: PHYSICAL DIVISIONS.

forms an inland waterway it cannot be used by ocean-going vessels owing to a sand-bar between Lake Alexandrina and the sea. To the west of the Murray River lie St Vincent Gulf and Spencer Gulf, both rift valleys. They provide harbours at Adelaide, Port Pirie, and Port Augusta. North of these inlets, separated from the Murray-Darling Basin by the Flinders Range and Barrier Range, is the Lake Eyre Basin. The watershed between these areas is completed by the Grey Range.

The Lake Eyre Basin is a vast saucer-shaped area of inland drainage in which lie many salt lakes, among them Lake Gairdner, Lake Torrens, and Lake Eyre itself. Much of the region is barren desert, very sparsely peopled. Lake Eyre, which lies below sea level, is no more than a vast depression of clay encrusted with salt. It is on these salt flats that Donald Campbell is to try to beat the world land speed record in his car—*Bluebird*. Except in years of excessive rainfall the rivers which flow towards it contribute a mere trickle of water and in summer usually dry up altogether.

The Carpentaria Lowlands are drained by such rivers as the Flinders and Mitchell (named after explorers), and are separated from the Lake Eyre Basin by the Barkly Tableland and Selwyn Range.

Throughout the Western Plateau and the Central Plains settlement is only possible where a good supply of water is to be found for men and stock. The early pioneers managed with water from surface streams but it was quite inadequate, especially in areas with an annual rainfall of less than 10 in. Development only became possible when it was discovered that there were, in many places, vast stores of water underground. When borings were made water often gushed out on the surface. These borings, many of them over 1,000 ft in depth, are known as artesian wells. Much of the water has travelled long distances underground through porous rocks from the Eastern Highlands where rainfall is heavier. The pressure caused by the great weight of accumulated water forces some of it to the surface. The most usual rock structures that give rise to artesian wells when borings are made are shown in Fig. 62. Rain falling on the porous rock at *C* gradually passes downwards until it reaches the impermeable layer *E*. The layer *D* stops the water from passing upwards, so it accumulates underground until the rocks are saturated to the level of the dotted line *X*. If a boring is now made at *W* the level in the rock falls, and water is forced from the mouth of the boring as long as it remains below the water level. This is an artesian well. When the water level falls below the mouth of the boring it becomes necessary to use a pump—usually a windpump. Large basins where artesian water can be obtained extend over the greater part of the Central Plains (see Fig. 63). The Great

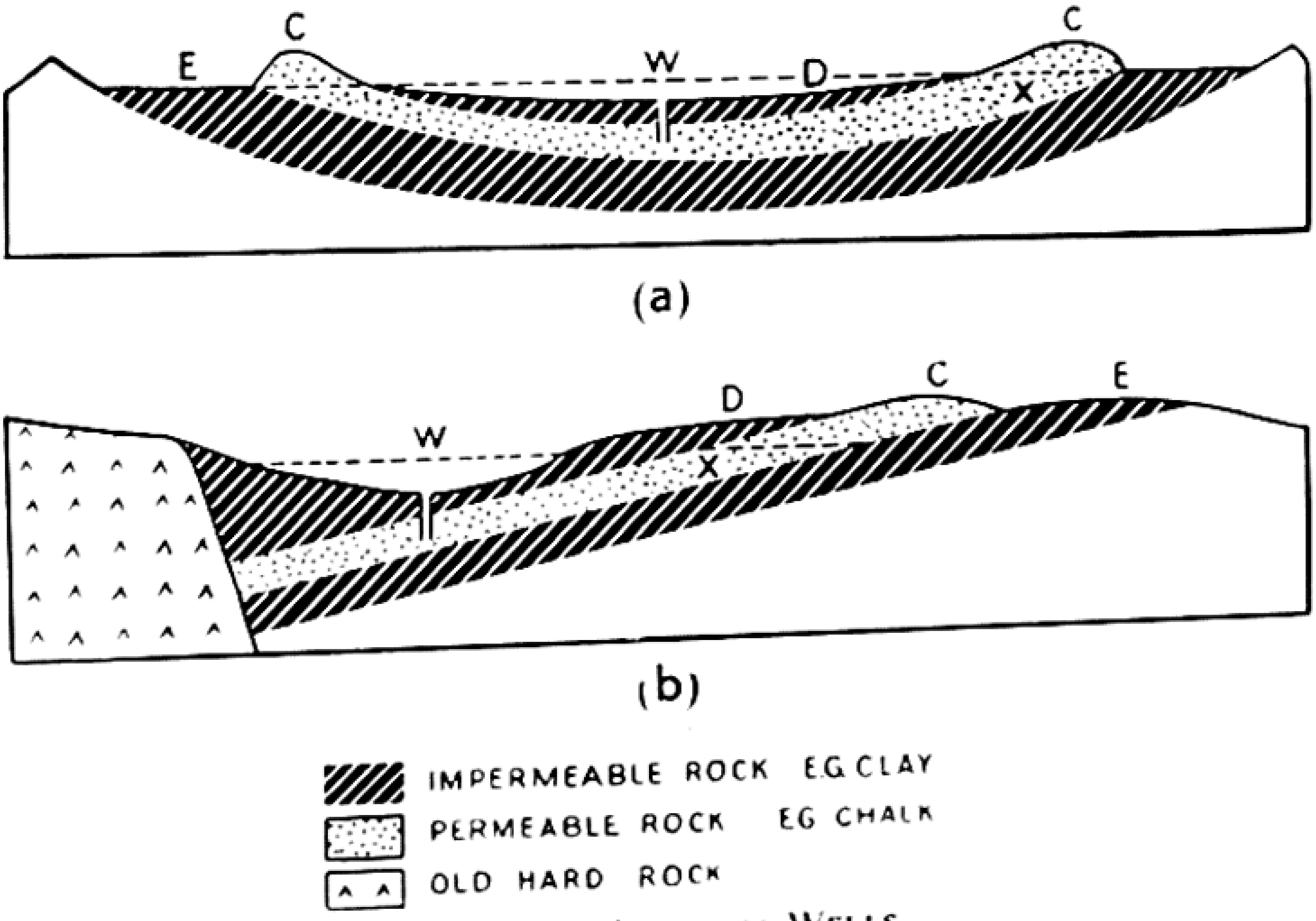


Fig. 62. ARTESIAN WELLS.

Australian Basin, the largest of these areas, covers a region as large as France, Germany, and Spain together.

Most of the artesian water is used for watering cattle and sheep. Sometimes it is tapped to supply towns such as Broome on the north coast of Western Australia. Very little artesian water is used for irrigating crops owing to the dissolved mineral substances it contains.

THE EASTERN HIGHLANDS lie roughly parallel to the east coast of Australia. They extend from Cape York in Queensland to the State of Victoria, and continue on the southern side of the shallow Bass Strait in Tasmania. They formed a formidable barrier to the early settlers (see p. 276) and came to be known as the Great Dividing Range. The original ranges consisted of folded rocks but these have been so weathered and eroded that the surface is now plateau-like in many places, dropping steeply in the east to the Pacific Ocean and more gently in the west to the Central Plains.

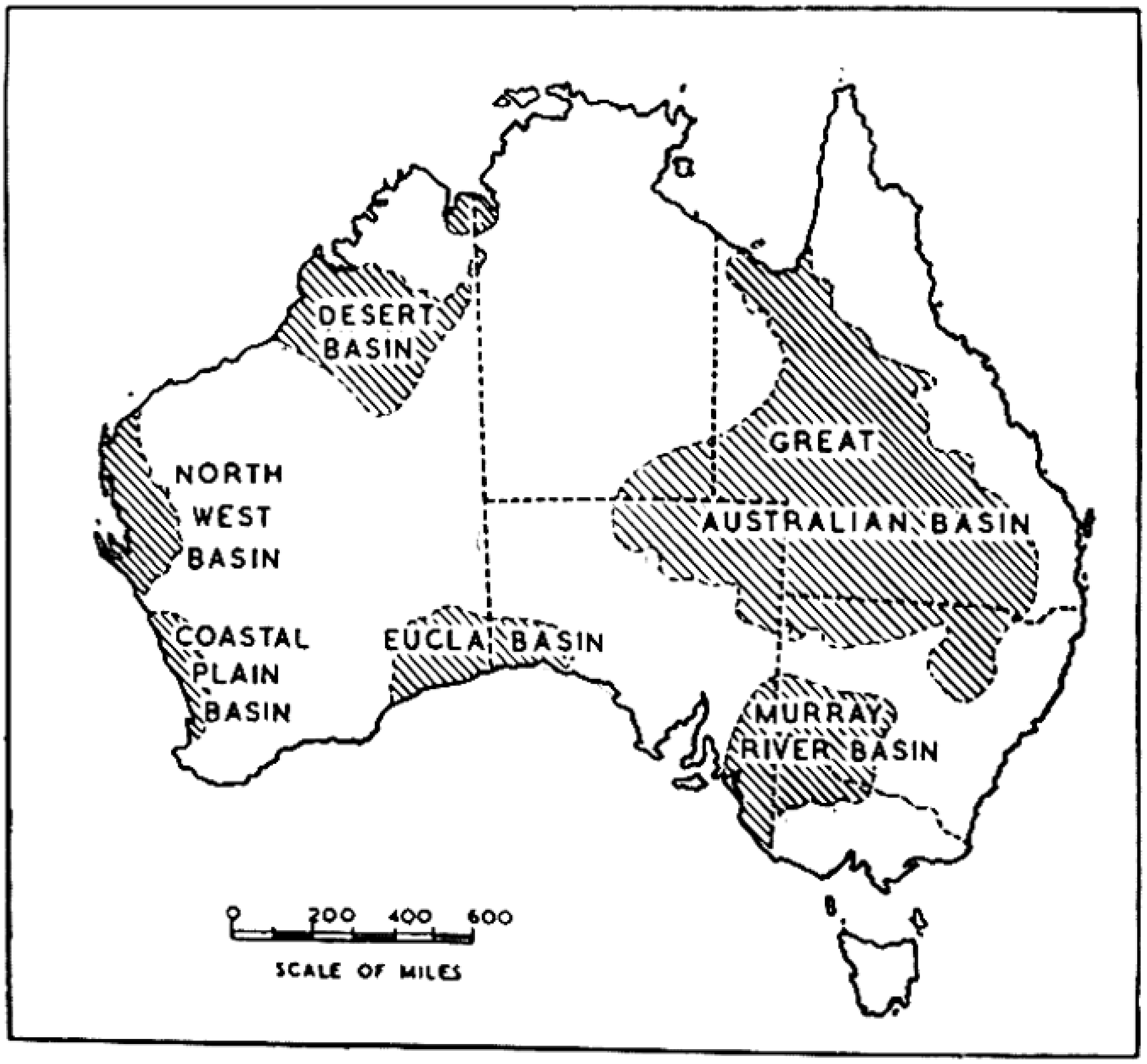


Fig. 63. Australia: Artesian Basins.

In New South Wales where the mountains rise, on an average, to between 3,000 ft and 4,000 ft, they are known as the Blue Mountains. Mount Kosciusko reaches 7,328 ft, and is the highest peak in Australia. Here, and in the north-east of Victoria, many of the mountain peaks are snow-covered in winter and provide fine slopes for winter sports. In the south of Victoria, near Melbourne, the altitude decreases again; the Dandenong Ranges rise to an average height of little more than 2,000 ft. In Tasmania the mountains are rugged and although they reach little more than 5,000 ft, the country is very wild. This is largely because Tasmania has been glaciated. There are deep gorges, sheer cliffs, and lake-filled valleys from which swift rivers and streams flow to the sea.

Most of the rivers of Australia rise in the Eastern Highlands. Those flowing east are short and swift. In their upper reaches there are often waterfalls, but near the sea they are liable to flood. Their valleys form useful routes to the interior, especially those of the Hunter and Fitzroy rivers which are used by the railways leading inland from Rockhampton and Newcastle.

Along the east coast are a number of first-rate deep natural harbours. Of these, Port Jackson—on which the City of Sydney stands—is undoubtedly the finest. North of Rockhampton the anchorages are protected by the Great Barrier Reef which lies roughly parallel with the coast for over 1,200 miles. This Barrier Reef has been built up in the warm, shallow water by tiny coral polyps over a long period of time, and is still "growing". It is really a whole series of reefs, many of them just below the surface of the sea, and is marked by lines of white breakers. Seen through the clear water from a small boat, the red, pink, and white corals are a sight of great beauty. The reefs yield oysters, sponges, and pearl-shell (for making buttons).

As the coral polyps only flourish in clear, salt water, the silt and freshwater brought down by the larger rivers result in irregular gaps which make it possible for ships to gain an entrance to the long channel of smooth water inside, and to reach the ports on the river estuaries. This channel—the "Grand Canal" as it is sometimes called—varies in width from 20 to nearly 100 miles, with an inner zone which can be used by shipping without undue risk, and an outer zone which is dangerous for large ships.

### Climate

Nearly half of Australia lies north of the Tropic of Capricorn, reaching to within 10° of the Equator; the southern temperate part extends southward to latitude 44° S., though the mainland reaches only to 38° S. On the whole, the difference between average summer and winter temperatures is not great, normally less than 11 C°. (*20 F°.*)—very much less than in the larger land masses of the northern hemisphere where winters in similar latitudes are usually severe. The daily range of temperature in inland areas is, however, considerable; after hot, cloudless days the nights are often extremely cold.

In summer (January), when the sun is roughly overhead in the centre of the continent, temperatures in this area reach between 27° C. (*80° F.*) and 32° C. (*90° F.*). The average January temperature at Alice Springs is 27° C. (*80° F.*).

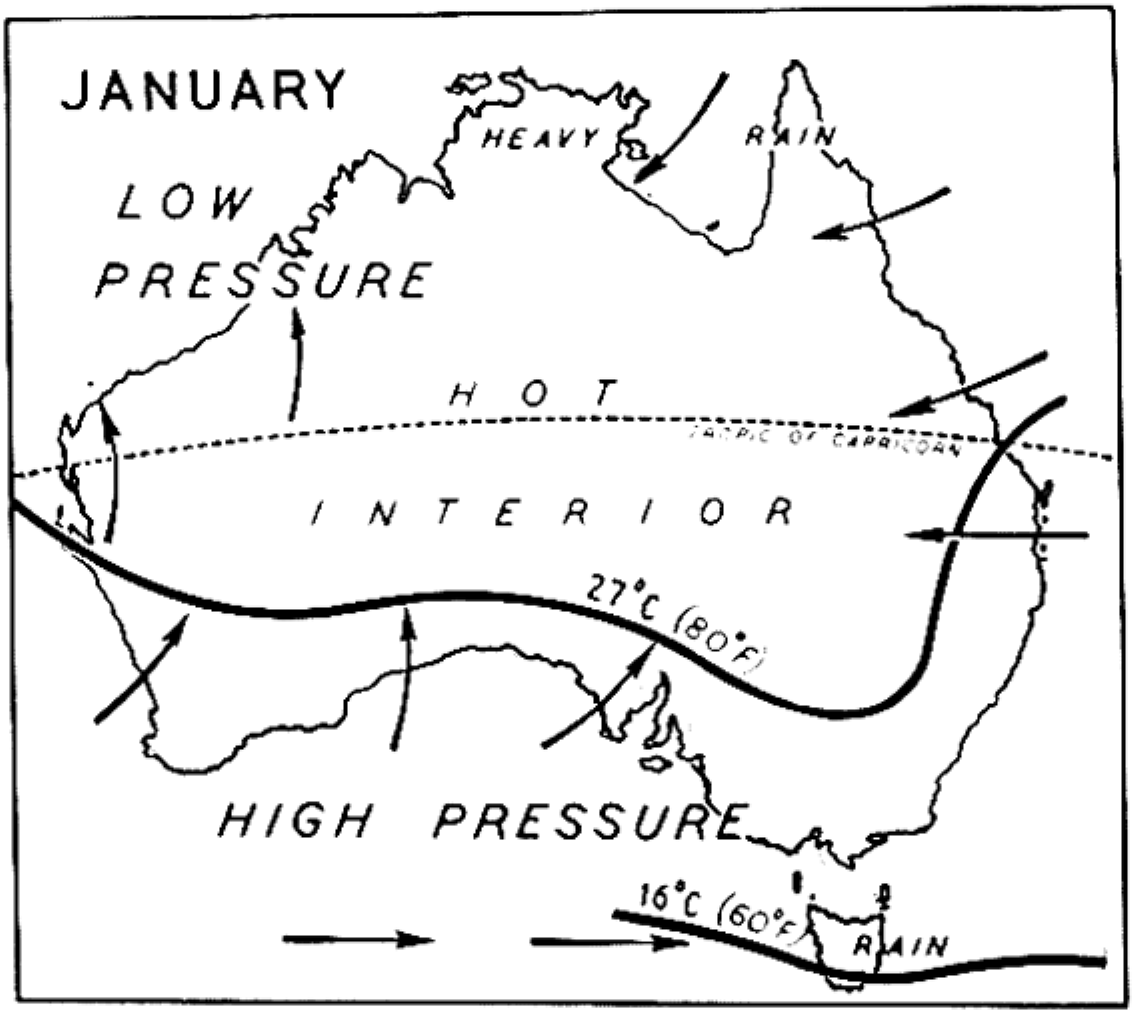


Fig. 64. Temperature and Winds—January.

Pressure is low, especially in the north-west (see Fig. 64), and winds are drawn in from the high-pressure area to the south, across the Dividing Range from the east, and from the Arafura Sea and Torres Strait in the north. In the south the winds bring little rain for they do not cross any considerable expanse of sea; but in the north and north-east the winds bring heavy monsoon rain. Tasmania is south of the high-pressure belt and receives the westerly winds (the "Roaring Forties") all the year round. To the west of the mountains there is a very heavy rainfall.

In winter (July) the pressure belts have moved north and a high-pressure area extends across Australia south of the Tropic of Capricorn (see Fig. 65). Winds north of this area blow towards the sea, and tropical Australia has little rain except along the east coast. The south-west and south-east receive rain in July from the belt of westerly winds which now extends well north of Tasmania. These regions which make up the hinterlands of Perth, and of Melbourne, have hot dry summers and warm wet winters—a Mediterranean type of climate.

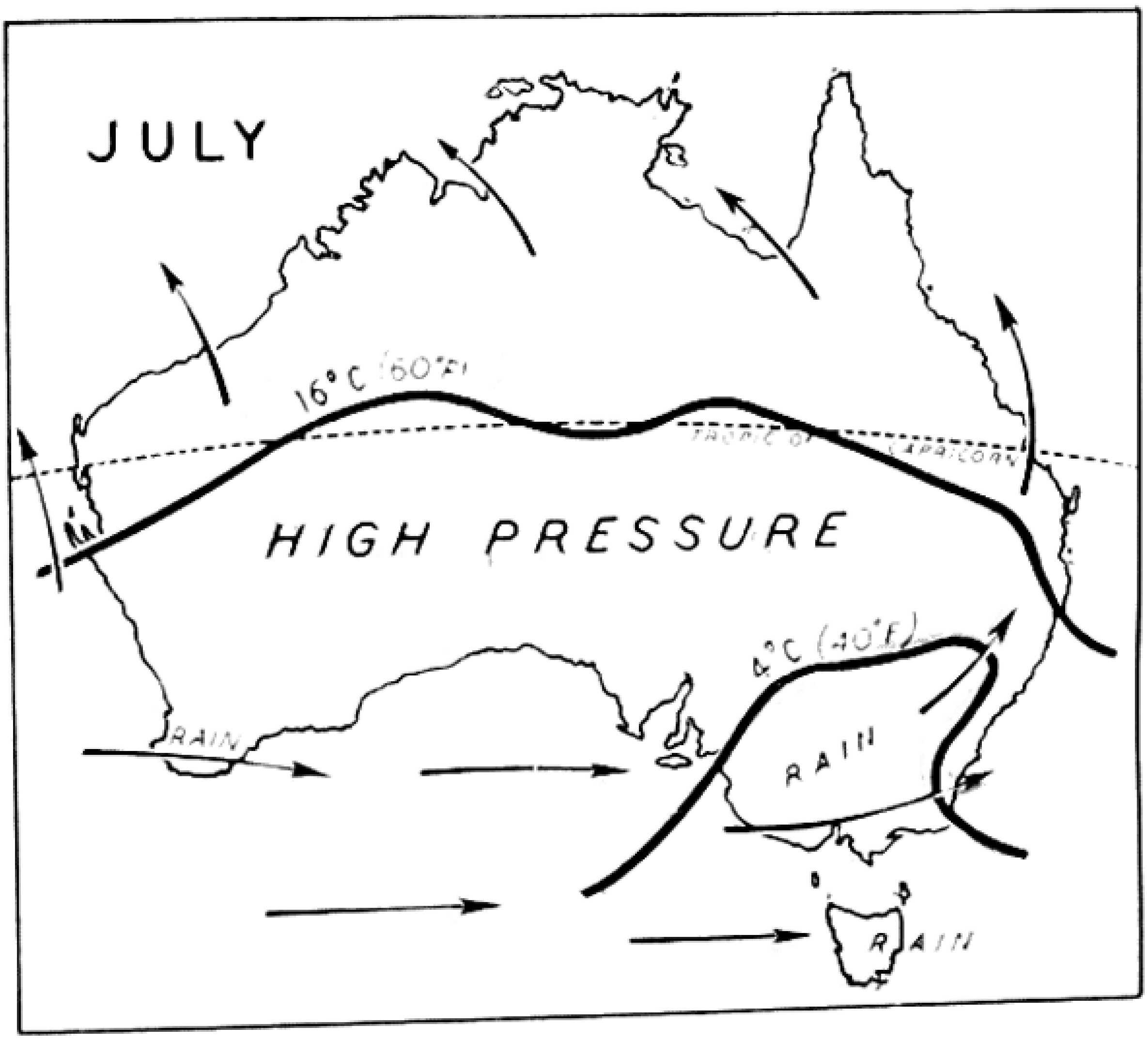


Fig. 65. AUSTRALIA: TEMPERATURE AND WINDS IN JULY.

A sketch map of Australia may usefully be drawn (Fig. 66), using the above information and the annual rainfall map to show four main divisions with (*a*) rain in summer, (*b*) rain in winter, (*c*) rain all the year round, (*d*) little or no rain.

An important point to remember about rainfall in Australia is that it is unreliable, and in any one year may rise considerably above, or fall considerably below, the average annual rainfall shown in climate statistics. The Australian farmer must therefore always bear in mind the possibility of serious drought and of sudden, disastrous flood.

## Vegetation

The wetter parts of Australia were originally covered with evergreen forests, mainly of various types of eucalyptus tree, thinning inland to savanna in the north, and to temperate grasslands in the Murray-Darling Basin. Eucalyptus trees vary from very tall types to small, branching trees called mallee, which grow no taller than a man. The eucalypts do not shed their leaves but the old bark peels off every year, exposing the new, light-coloured bark below, as plane trees do in the city streets of Britain. They include the hard jarrah and karri trees of the south-west which are very valuable for their timber, and also the gum trees of the south-east, some of which yield eucalyptus oil, while others are pulped for paper making.

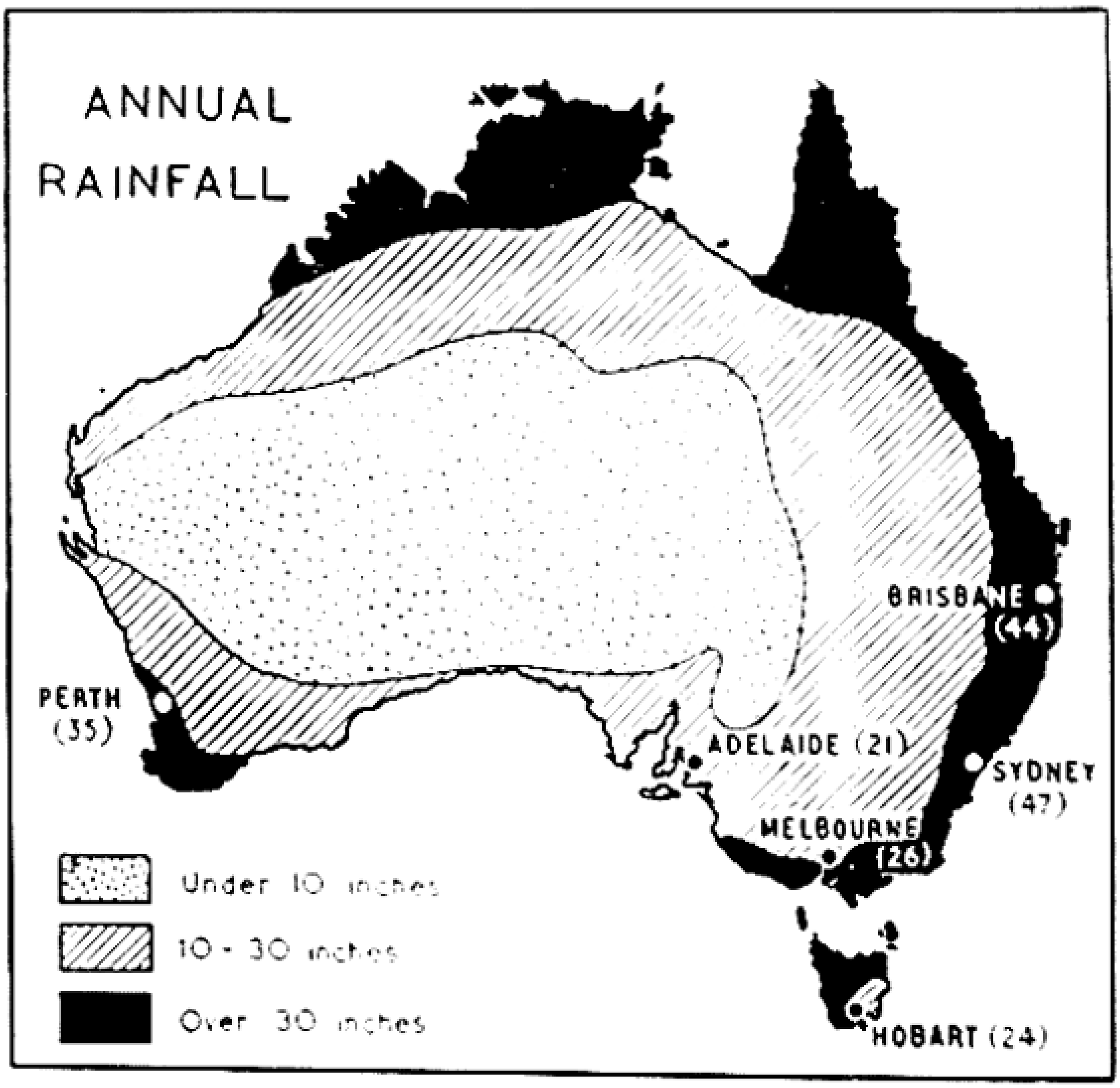


Fig. 66. MEAN ANNUAL RAINFALL.

In Queensland and Tasmania there are pine trees. The kauri pine of Queensland yields a useful soft wood; in Tasmania the huon pine yields a white timber, and the King William pine a soft, reddish wood.

In many parts of Australia there are wattle trees, some of them covered in summer with pale golden fluffy flowers.

In the north-east are tropical rain forests where, instead of eucalyptus trees, palms, ash, cedar, and beech, grow luxuriantly, hung with trailing liana vines.

Vast areas where the rainfall is too scanty for true forest are covered by scrub. A belt of mallee scrub extends from the west coast around Geraldton, eastward to the Great Australian Bight and at one time extended to areas east of Adelaide where the early settlers used bullock teams to clear the land for wheat growing. Today new areas are cleared by tractor and machinery. The roots of the mallee contain oil and are excellent for firewood. In the very dry areas a sage-green plant known as saltbush provides fodder for sheep, and mulga (one of the wattle shrubs) is also found.

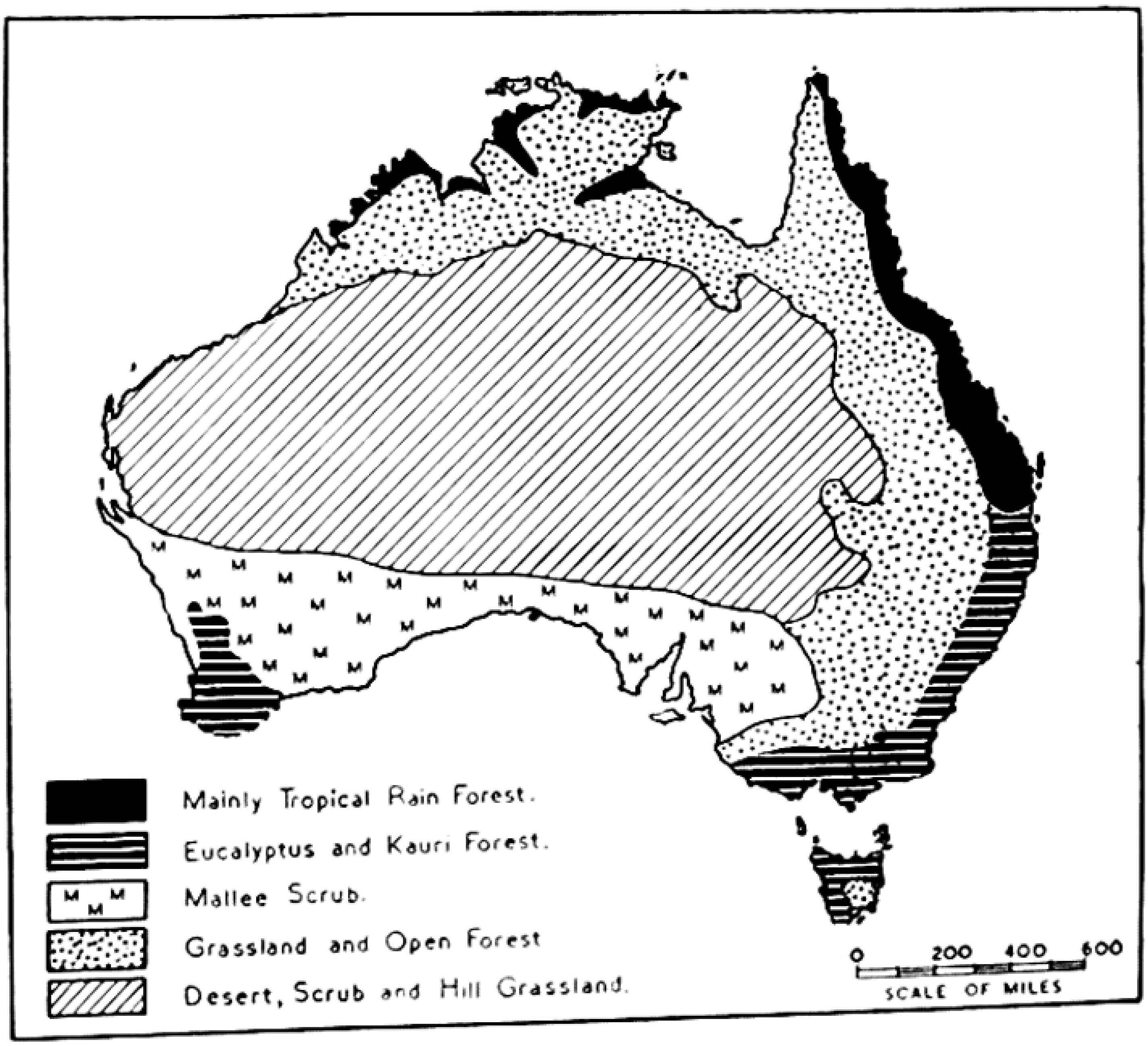

■ Mainly Tropical Rain Forest.
▤ Eucalyptus and Kauri Forest.
M M M Mallee Scrub.
░ Grassland and Open Forest
▨ Desert, Scrub and Hill Grassland.
0 200 400 600
SCALE OF MILES

Fig. 67. AUSTRALIA: NATURAL VEGETATION.

Apart from the "natural" vegetation, a cactus known as "prickly pear" was imported from America and established itself so quickly that millions of acres in Queensland and New South Wales were soon covered. This "weed" threatened to engulf valuable farmland and defied attempts by the farmers to get rid of it, until scientists discovered that a certain black and yellow caterpillar would feed on the plant. These caterpillars were bred in their millions and encouraged to gorge themselves on prickly pear until the victory was won.

### Native Animals and Birds

Australia has been isolated from other large land masses for a very long period. Primitive forms of life which at one time had a much wider distribution have thus managed to survive in the continent. Among them are the marsupials which carry their young in a pouch. The best known are the vegetarian kangaroos and wallabies. The kangaroo lives in open grassland country; the smaller wallaby in scrub country among the hills.

The platypus has a furry coat like a mole, a broad bill like a duck, and webbed feet. It lays eggs, and has a pouch for its young. The platypus is aquatic and feeds on worms, shell-fish, and insects.

The native porcupine has short, sharp quills for protection, and is adapted for digging. Like the platypus it lays eggs.

The wombat is similar in size to a badger and has similar habits, feeding on roots and leaves, and digging burrows in the earth.

The native bear or koala lives on the leaves of certain gum trees. It is easily tamed, and was at one time plentiful, but for many years it was killed by sportsmen and the skins were exported. Today, the few remaining koalas are protected in sanctuaries.

The dingo, which is not a marsupial, is a wild dog-like creature. It is carnivorous, attacks cattle and sheep, and eludes man's attempts at extermination with great cunning.

Australian birds include the emu, cassowary, and the beautiful lyre bird, which is found in the forest areas of Victoria and New South Wales.

Except for the dingo, the native wild creatures of Australia are relatively harmless, though they can sometimes cause considerable annoyance. The Darwin Golf Club, for example, has a local rule that "when a hawk, lizard, crocodile, snake, or wallaby takes the ball, another shall be dropped".

## Discovery and Exploration

Australia was not discovered by Europeans until the seventeenth century. Torres sailed through the Strait south of New Guinea in 1606 but failed to sight the Australian coast, though the Strait now bears his name. But, shortly afterwards, Dutch seamen entered the Gulf of Carpentaria and sailed along the coast of Cape York; other Dutch sailors touched the west and north coasts. In 1642 Abel Tasman sailed all round "New Holland" as the continent was then called, but he did not sight the fertile east coast, though he did reach the island of Tasmania. It was not until Captain Cook, a Yorkshireman, made his first Pacific voyage in 1770 that the shape of Australia was determined and the possibilities for settlement made known. He sailed along the east coast, named the more conspicuous features, and established Britain's claim to much of this territory. Botany Bay, later to become well known, was so named by Cook because the ship's botanist discovered many new plants there.

The first white Australian settlements were penal settlements. Previously, convicts from Britain had been deported to North America, but when the American Colonies were lost, as a result of the American War of Independence, penal settlements were started in Australia. The first landing was made by Captain Arthur Phillip at Botany Bay in 1788, and the settlement was later transferred to Port Jackson, where Sydney now stands. Wheat was grown successfully to feed the colony and in 1797 merino sheep were introduced from South Africa. Other convict settlements followed at Hobart in Tasmania in 1803, in Queensland in 1824, and a free colony was founded in Western Australia in 1829.

During this time penetration inland was slow and difficult, but in 1813 pioneers from the east coast succeeded in crossing the Blue Mountains to see a vast area of potential pasture land stretching away to the west. In 1829 and 1830 Captain

Charles Sturt followed the streams flowing westward from the Blue Mountains and discovered the Darling, Murrumbidgee, and Murray rivers, eventually reaching the south coast of Australia. Victoria and Melbourne were founded by free settlers in 1835, and South Australia began with the settlement of Adelaide in 1836. At a later date the free settlers successfully demanded that the transportation of convicts should cease; it was abandoned in the eastern states in 1853, though not until 1868 in Western Australia.

The flow of immigrants was speeded up by the discovery of gold in 1851. Edward Hargraves, an Australian who had taken part in the Californian gold rush, made the first find at Bathurst in New South Wales. This was followed by rich finds at Ballarat and Bendigo in Victoria. The population of Victoria trebled in three years and many of those who failed to make fortunes in the goldfields later turned to farming, or worked on the construction of roads and railways.

Just over forty years after the first discoveries, new goldfields were found at Kalgoorlie in Western Australia.

By the end of the nineteenth century most of the continent had been visited by white explorers, including the vast interior where the nomadic aborigines lived (see below). Each of the six colonies had become a self-governing state and was concerned mainly with the development of its own resources. In 1900 they were federated and the Commonwealth of Australia came into being. Today the Crown is represented by a Governor-General, there is a Senate with six representatives elected by universal franchise in proportion to population. The Northern Territory is administered by the Commonwealth Government which meets in the capital, Canberra—a city which has been laid out in a beautiful tract of country in the Australian Alps, separated from any individual state.

## The Aborigines

When the first settlers came to Australia in 1788, the only native inhabitants were the aborigines, or "black fellows" as they came to be called. These chocolate-coloured people lived by hunting and collecting, and probably numbered about 300,000. Since then the numbers have decreased. Today there are about 100,000 aborigines, most of them of mixed descent.

The "black fellow" is of medium height, usually with wavy, black hair. He has a low forehead with heavy eyebrow ridges, a nose with wide nostrils but flattened between the eyes, and jaws which project at the mouth. Those who still live apart from the white population wear no clothes and use implements of wood or stone, including spears, stone axes, stone knives, and a curved stick known as the boomerang which, when skilfully thrown, returns to the thrower. They live together in tribes and manage to sustain life where no white man could survive, hunting kangaroos, emus, birds, snakes, lizards, turtle, and fish, and collecting wild roots, insects, fruits, nuts, and wild honey.

The tribesmen decorate their skins by making cuts with flint instruments and keeping the wounds open until the surface has a curious welted appearance. As a race they are superstitious and firmly believe that ghosts and demons lurk everywhere.

Most of the aborigines today live in Western Australia, the Northern Territory, and the remoter parts of Queensland and New South Wales. Government policy is to accept them within the white community and many of them work on cattle stations, in road transport, or in country towns. This policy, however, is not everywhere acceptable and many aborigines live in special reserves. Arnhem Land is reserved for aborigines and here their way of life is little changed.

### The White Population

Apart from the "black fellows" there are very few coloured people in Australia. At one time Australia had a "White" policy which excluded coloured immigrants. It was established to protect the standard of living of white workers; it was thought that coloured workers would probably be prepared to work for lower wages and in poorer conditions than the white workers, who might thus have their standards lowered, or be thrown out of work. To-day, there is "restricted immigration". An Asian can stay in Australia if he can show good reasons why he should. But apart from a few

Chinese there are not many Asian immigrants. This is partly due to the constant concern lest densely peopled Asian countries such as Indonesia, which lies only a few hundred miles from Australia, might try forcibly to enter and settle people in the tropical north. The population, nevertheless, has grown steadily as the following figures show:—

| | | | |
|---|---|---|---|
| 1860 | 1,146,000 | 1940 | 7,069,000 |
| 1880 | 2,232,000 | 1950 | 8,186,000 |
| 1900 | 3,765,000 | 1960 | 10,227,000 |
| 1920 | 5,411,000 | 1966 | 11,200,000 |

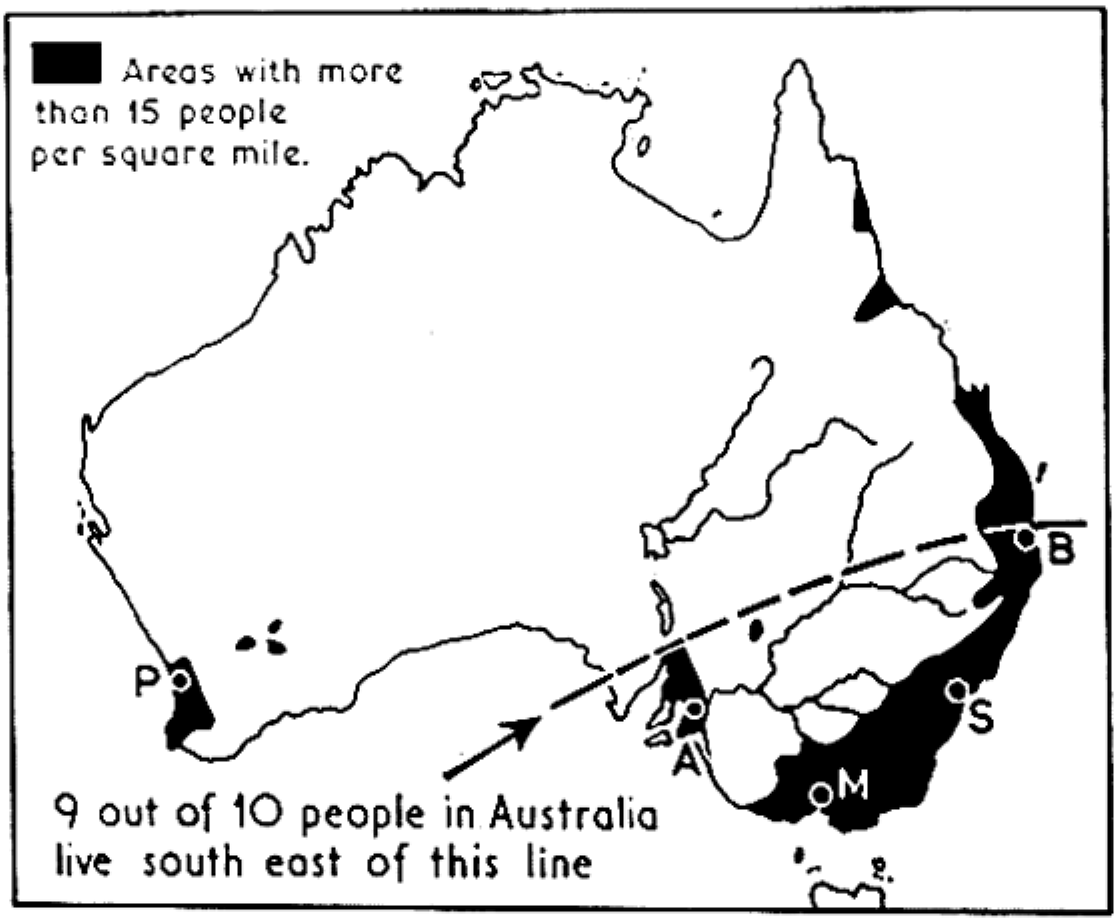

■ Areas with more than 15 people per square mile.
P
A
M
S
B
9 out of 10 people in Australia live south east of this line

Fig. 68. The Populated Areas of Australia.

The population today is made up as follows:—

| | |
|---|---|
| New South Wales | 4,120,000 |
| Victoria | 3,135,000 |
| Queensland | 1,600,000 |
| South Australia | 1,050,000 |
| Western Australia | 815,000 |
| Tasmania | 375,000 |
| Capital Territory of Canberra | 75,000 |
| Northern Territory | 30,000 |

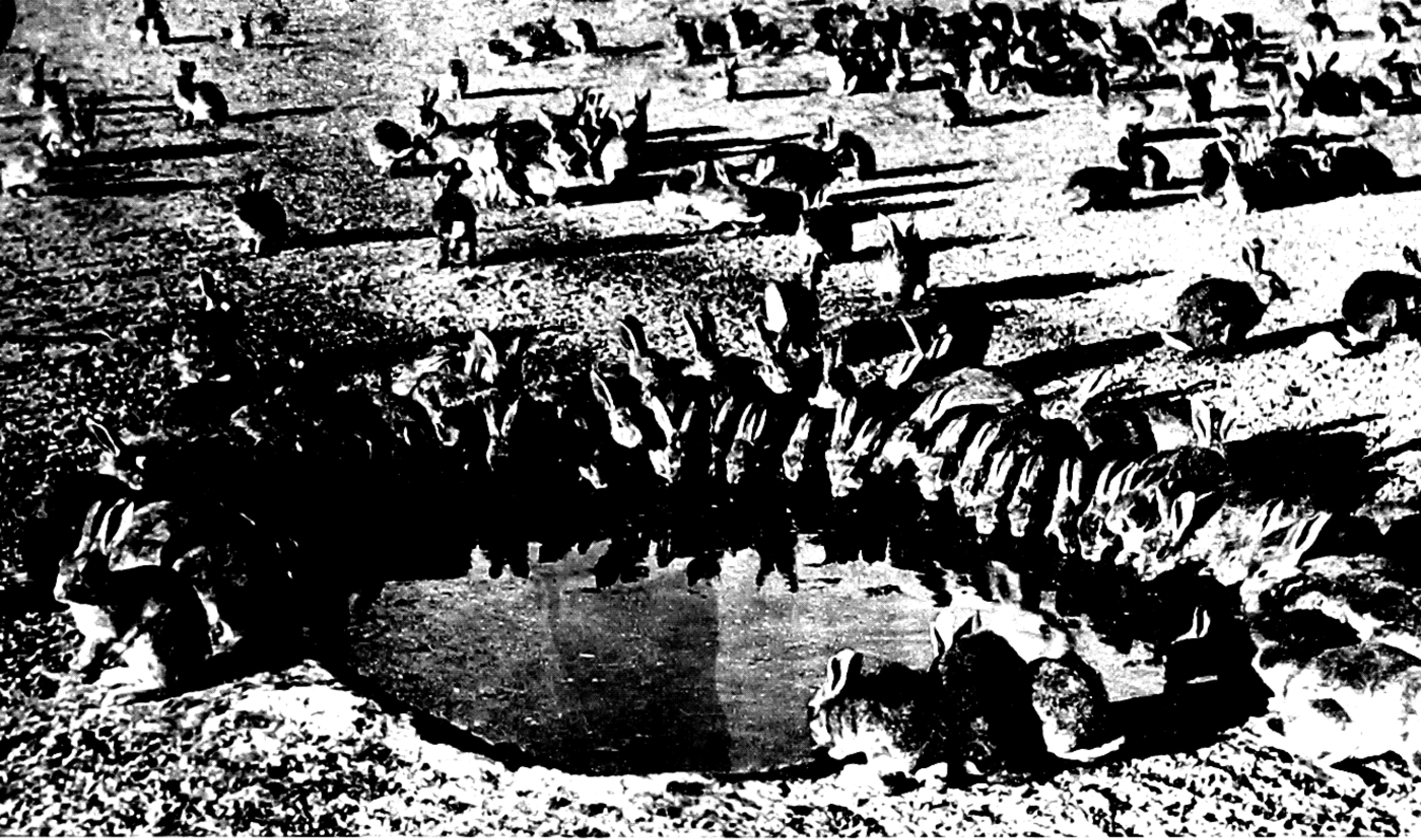
The most surprising fact about the population of Australia, essentially an agricultural country, is the high proportion of people living in towns. Today, about 70 per cent. live in the capital and provincial cities which lie on or near the coast, and only about 30 per cent. in the rural and mining areas. This is due partly to the mechanisation of farming and partly to the rapid growth of industry during two world wars. Tasmania, the smallest of the six states, is the only one in which more people live in the country than in towns. Quite recently, however, there has been a trend throughout Australia to establish light industries in the smaller country towns and this may lead, in time, to a more even distribution of population.

Australia is short of man-power in both farming and industry and it is hoped that the population may increase to twenty million or more by the end of the century. In recent years more long term and permanent immigrants have been arriving. As immigration goes on, it is hoped to spread the people more evenly; nearly one-third of the total population live in Sydney or Melbourne, while three-quarters of Australia has only one person to each square mile. One of the main problems at present is to build houses rapidly enough to provide accommodation for new immigrants.

Where do most of the immigrants come from? By far the largest number come from Britain and the Commonwealth. Large numbers also come from West Germany, Holland, and Italy; Central and Eastern Europe, especially Poland, Greece, Malta, Yugoslavia, and Hungary contribute many thousands, some of them political refugees. Indeed, since the war Australia has taken a quarter of a million refugees, easily the highest proportion in relation to its population of any country in the world.

*Above:* Half-wild Kangaroos near Lake Macquarie, New South Wales. (*Australian News and Information Bureau.*)

*Below:* Flowing Deep-bore Artesian Well East of Darling River, New South Wales (*Australian News and Information Bureau.*)



A Typical Scene in Rabbit-infested Country, causing Sheep-breeders Losses running into Millions of Pounds
(*Black Star*)

# CHAPTER XVII

## CATTLE, SHEEP, AND WHEAT IN AUSTRALIA

Australia is first and foremost a farming country, though great strides have been made in industrial development.

### Stock Raising

SHEEP are reared in greater numbers in Australia than in any other country in the world. They number over 160 million. By far the most important state for sheep rearing is New South Wales, with Victoria and Queensland taking second and third place. Many sheep are also reared in the wetter parts of Western Australia, in the immediate hinterland of Adelaide, and in eastern Tasmania. They are bred mainly for wool, most of which comes from merinos descended from Spanish sheep originally introduced from the Cape of Good Hope. Australian sheep have been bred to withstand the dry heat of the summer months, and are extremely hardy and free from disease. In some parts they can survive on very scanty herbage including salt-bush and the native grasses, if water is supplied from wells or artesian boreholes. But the merinos do best in the temperate parts of Australia where the annual rainfall is between 15 and 20 in. In areas of greater rainfall pure British breeds or cross-bred sheep are kept for both meat and wool.

The sheep farms, or "stations", are large, often covering many thousands of acres, and are divided into large paddocks, each up to 5,000 acres in extent, by miles of fencing. The paddocks are grazed in turn and are watered from artesian wells. The sheep farms are usually run by a family with the help of a few "jackaroos", or paid labourers, who attend to fences and ride round to look after the sheep. But at shearing time, when extra labour is needed, additional men are brought in. Expert gangs of as many as thirty shearers, organised by contractors, go from station to station taking their own cook and his "offsider", or assistant. These gangs usually start in Victoria in April and work their way northwards until they reach Queensland in October, or even November. A good shearer, using machine clippers, can take the fleeces from over two hundred sheep a day. He collects his sheep in a pen, shears them in turn on a wooden floor, and then turns them into another pen where they are branded. The fleeces are thrown deftly on to a table where they are tidied up and sorted according to the class of wool. They are then pressed into large sacks to form bales of about 300 lb. in weight, which are then labelled, and sent by road or rail to the auction sales in one of the large wool markets. Australia has the largest wool industry in the world.

In the wetter parts of Australia, especially in Tasmania, sheep are bred for meat, and there is now a considerable export of frozen lamb and mutton from Australia.

The main problem of the sheep farmer, especially in Queensland, is drought. When it comes, stock must at once be reduced in the affected area. Some are killed and sold for meat, some may be driven long distances to areas where the pastures are richer and have not suffered so much, or food may be brought in and fed by hand.

During periods of drought there is the added danger of bush fires which may sweep over large areas, burning every vestige of vegetation. Around farm buildings a belt of land is usually ploughed to act as a "fire-break".

Rabbits were introduced into Australia and bred rapidly until they became a very serious pest, competing with sheep for pasture. Twenty rabbits are said to eat about as much as one sheep and in many areas their numbers are high. Some years ago the rabbits were infected with a virus disease known as myxomatosis which is transmitted by mosquitoes. Millions of rabbits died, especially near the Murray-Darling River and its tributaries, and in other well-watered areas where mosquitoes breed. In many parts land that had previously been eaten bare by rabbits grew good grass for grazing stock. In one year it was estimated that the increase in production due to the reduction in rabbits was worth £50 million, of which the increase in sheep and lambs accounted for £34 million.

Unfortunately, where the destruction of rabbits has been most successful, foxes are now found to be killing sheep because their natural food supply—the rabbit—has gone. In parts of New South Wales and Queensland the kangaroos are also a serious pest, damaging fences, fouling water holes, and eating crops and pasture. These are hunted and hundreds of thousands are killed each year and the kangaroo meat is exported to Germany, France, Japan, and the U.S.A. But the most serious pest today is the dingo or wild dog. A 6,000 mile fence over 6 ft high runs through Queensland, New South Wales, and South Australia to protect the richer cattle and sheep lands from the marauder.

CATTLE REARING. Vast areas in Queensland and the Northern Territory provide grazing for beef cattle, but the difficulties of rearing cattle in tropical Australia are only now being slowly overcome. The land is dry for much of the year, and the pastures are poor except for a few weeks during the summer rains. Many of the watercourses dry up, and artesian wells must be sunk to get water. Many cattle die each year from thirst. The cattle must be taken long distances to the markets and to the ports for export.

Cattle first brought to this area from Britain were accustomed to the rich pastures of the home country. Breeds such as the white-faced Herefords, although providing excellent beef animals, were not able to stand the heat and failed to nourish on the poor pastures. Slowly they deteriorated. Recently, the Herefords have been crossed with humped Zebu cattle from the hot paddy fields of Asia and the resulting animals are much hardier. They thrive on the coarse grasses of the scrub areas, and resist the heat and attacks by tropical insects, such as the cattle tick, much better than the pure British breeds. The main disadvantage is that they prove more difficult to handle and need more stockmen to control them.

The problem of getting the cattle to the coast in good condition is a difficult one. Many of them have to be driven hundreds of miles "on the hoof" across arid land with little food or water. Only the older beasts can stand such a trek, and when it is over they are often in poor condition and do not make good beef.

The chief cattle-breeding areas are within 250 miles of the north ooast of Australia where the summer monsoon rains give rise to a fair supply of good grass, especially in the Victoria River country and on the Barkly Tableland which is over 1,000 ft above sea level. Nevertheless, the density of cattle is low—roughly one beast to 100 acres. For this reason many of the cattle stations are enormous; two of them extend for over 10,000 square miles. But lack of man-power is a very serious problem for there are only about 30,000 white men in the Northern Territory. Fortunately, several tribes of aborigines provide stockmen.

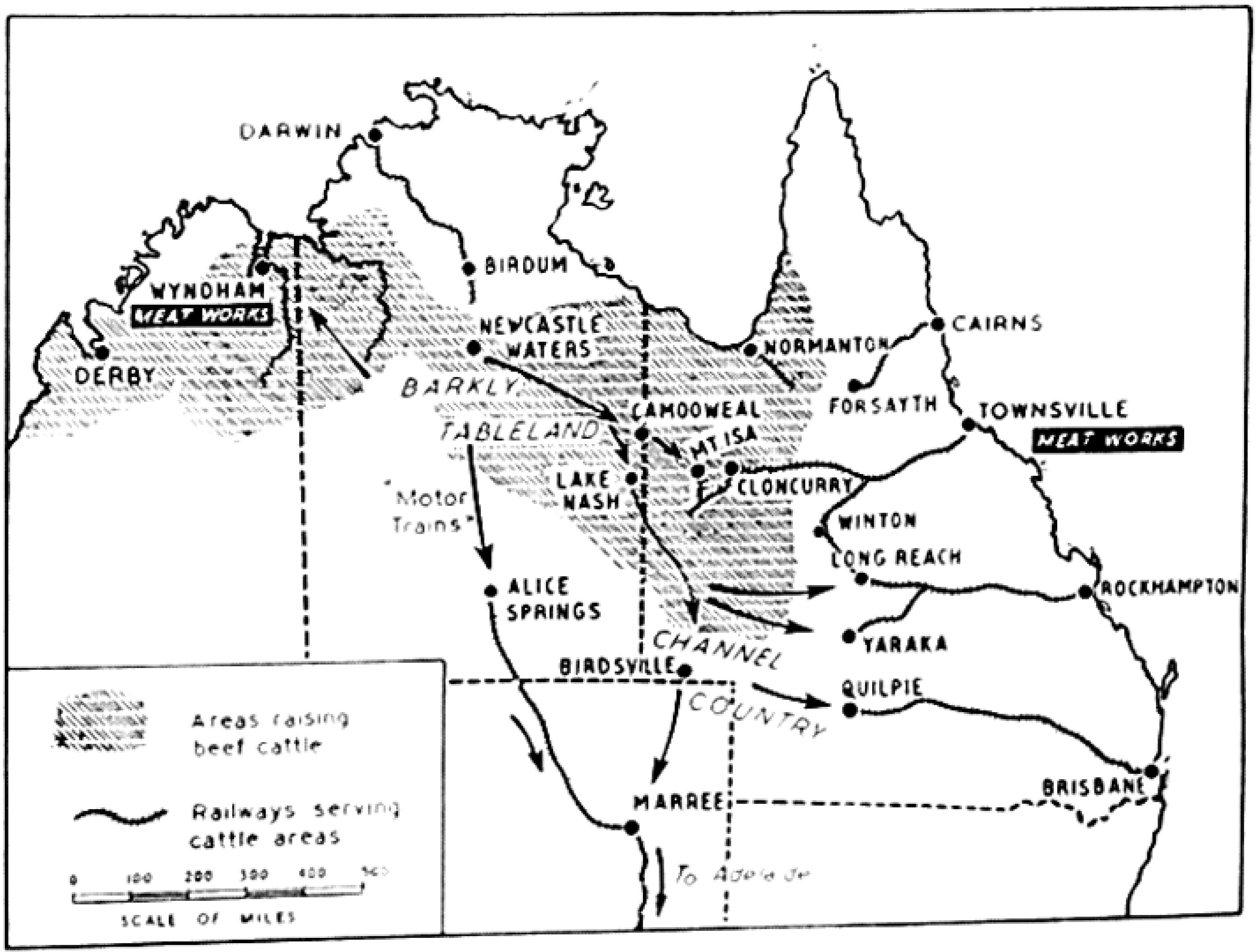


Fig. 69. CATTLE REARING IN NORTHERN AUSTRALIA.

Fat cattle from Victoria River go mainly to Wyndham for slaughter. In the inland areas efforts are now being made to take cattle by road to the nearest railhead. Cattle collected at Newcastle Waters, for example, are now sent south by "road-trains". These consist of a series of cattle trucks, capable of taking up to 300 beasts in all, drawn by a diesel engine. They follow the bitumen road to the railhead at Alice Springs. In this way, not only do the cattle arrive in better condition, but it is also possible to take younger beasts.

Cattle from the Barkly Tableland are sent east to Queensland through Camooweal and then either to a railhead, or to the south-west of Queensland to what is known as the "Channel Country". This is a district where summer monsoon rains flood the country so that the water slowly cuts shallow channels as it drains away, forming a natural irrigation system. After the rains the land is covered by a green carpet of fine pasture grasses and cattle fatten quickly. At present many of these fat cattle are driven in "mobs", or taken by truck, from Birdsville to the railhead at Marree in South Australia, but roads will certainly be made to link the Channel Country with the railways at Yaraka and Quilpie, leading to the coast at Rockhampton and Brisbane respectively.

At Glenroy, nearly 200 miles south-west of Wyndham (see Fig. 72), fat cattle are killed in a local abattoir, the meat chilled and then flown by freight plane to the freezing works at Derby. In this way the long drive to the coast is avoided and the meat which reaches the ports is from cattle killed in prime condition.

The development of the beef industry depends now on improving the stock, improving water supplies, speeding transport to the coast by improving roads and possibly by extending railways and air transport, and equipping ports and meat works to deal with the cattle. There will be no difficulty about finding markets: Britain has agreed to take the whole meat output for many years to come.

DAIRYING. Rich enough pastures for milk production are found in the east and south-east of Australia—especially in the coastal areas of Victoria, New South Wales, and southern Queensland where temperatures are lower and the rainfall is more constant than in the interior. The Gippsland district of Victoria is particularly noted for dairying. Most of the surplus milk is made into butter in co-operative factories, and some cheese is also made.

Pigs are fattened in the dairying districts on the skimmed milk and whey from the factories, and in Queensland efforts are being made to increase the number of pigs by growing additional feeding stuffs.

## Wheat

Wheat has been grown extensively in the temperate parts of Australia for over 100 years. The first land to be ploughed for wheat was in South Australia, near the coasts of Spencer and St Vincent Gulfs. Then, as railways and roads were constructed, the wheat-growing areas spread into Victoria and New South Wales. Wheat is also grown in Western Australia on the richer soils but suitable areas are limited by low rainfall. Wheat can, in fact, be grown in areas with as little as 10 in. of rain provided it falls in the growing season, and there is not too much evaporation. There is also good wheat-growing land around Toowoomba and Warwick in south-eastern Queensland. Here a heavier rainfall compensates for greater evaporation.

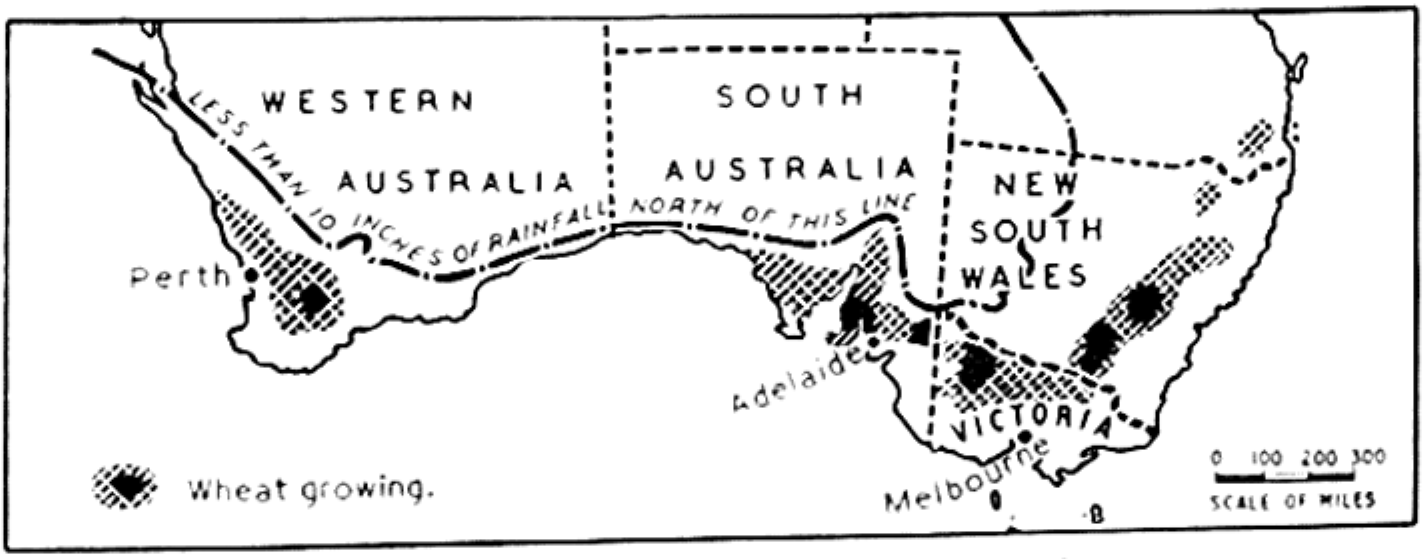


Fig. 70. AUSTRALIA: WHEAT-GROWING AREAS.

The production of wheat in Australia is cheap, for farms are highly mechanised and fields are large. The seed is sown in late autumn and early winter after the rain. Then, in January, when the crops are mature the grain is cut and threshed by combine harvesters. Supplies thus arrive at northern markets when stocks of wheat are low. Large quantities are sent to China.

# CHAPTER XVIII

## THE STATES OF AUSTRALIA

For a hundred years or more Australia lived by farming and gold mining, and pastoral farming is still the largest single element in the economy, but in recent years there has been great industrial development resulting in the growth of larger and larger towns and cities.

Industrial development began on a small scale in the First World War. It was further encouraged in the slump of the early 1930's when the prices of Australian wheat and wool dropped so seriously that her statesmen began to think it unwise to rely too much on selling farm produce in order to buy manufactured goods. During the Second World War of 1939-45 the process was speeded up, especially in the heavy steel industries. Today over a million workers are employed in some 59,200 factories.

The steel industry uses the rich iron ore from Iron Knob in South Australia for smelting on the New South Wales coalfield, mainly at Newcastle and Port Kembla. The limestone for the process is imported from Tasmania.

Steel is used in the manufacture of farm machinery—tractors, ploughs, harvesters, etc. It is also used to make nails, wire, pipes, and sheet metal for the motor-car industry.

Australia leads the world in the production of lead, is third in zinc production, and fourth in gold.

Many of Australia's industries depend on raw materials from the farms and mainly supply internal needs. Textile mills make woollen, cotton, and rayon cloth; dairies make cheese and butter; canneries deal with meat, fish, and fruit. There are flour mills, sugar refineries, wood pulp and paper mills, and tanneries. Other factories make household goods—furniture from Australian woods, glassware, soap, rugs, and carpets. Despite the great importance of agricultural, pastoral, and mining activities in Australia, manufacturing now employs twice as many people as all three of these together. In the following pages considerable emphasis is therefore laid on industries connected with the larger towns and cities.

## Western Australia

Western Australia can be divided into three main natural regions (see Fig. 72):—

(i) The farmlands and forests of the south-west which have a winter rainfall;

(ii) The desert and scrubland of the main plateau area;

(iii) The tropical grasslands and rain forests of the north.

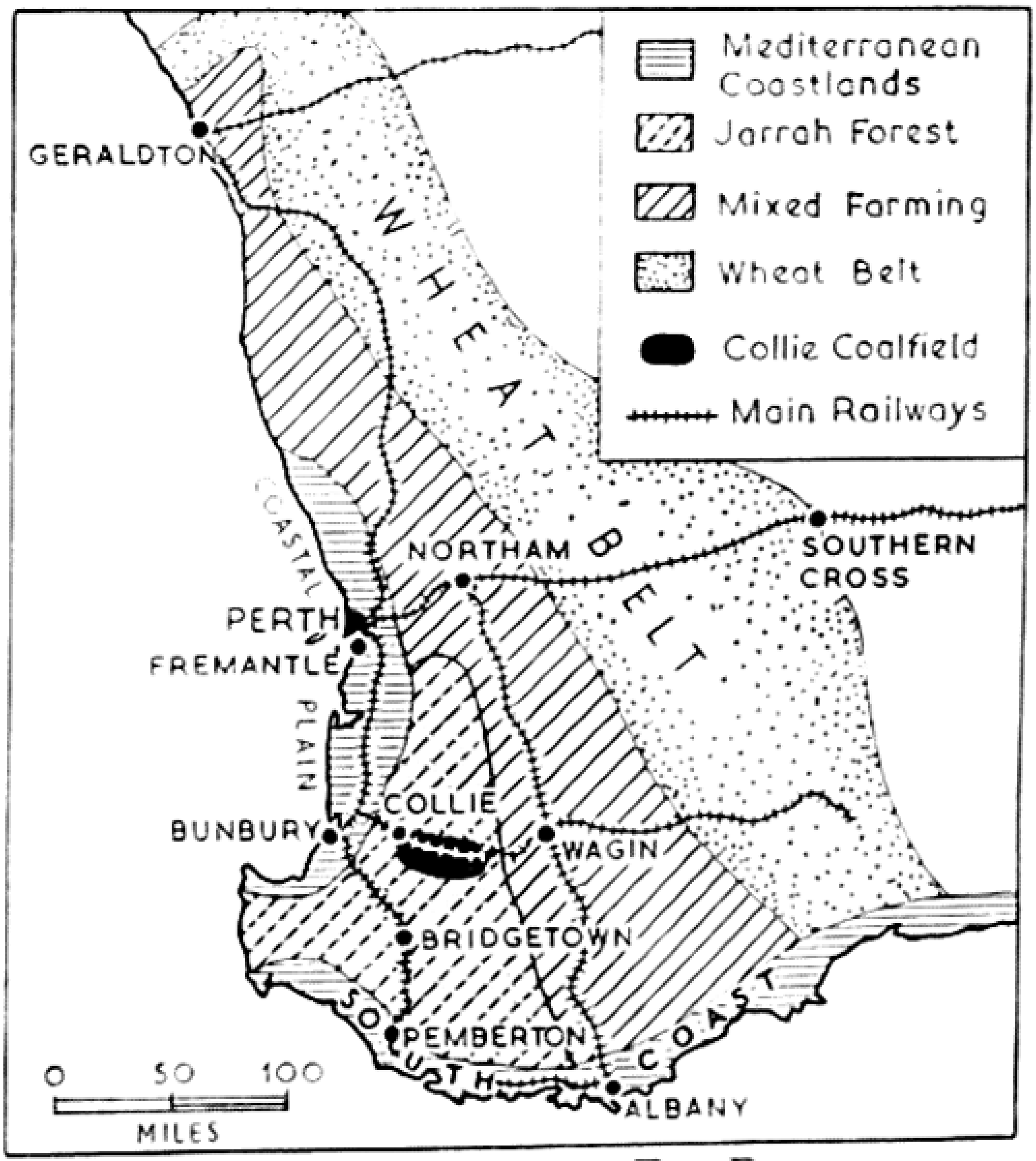


Fig. 71. WESTERN AUSTRALIA: THE FARMLANDS OF THE SOUTH-WEST.

THE FARMLANDS OF THE SOUTH-WEST are the most densely-peopled part of Western Australia. The region has a Mediterranean-type climate with winter rain. It can be subdivided into four farming belts (Fig. 71).

The warm coastlands, rich and well watered, are dairy farming and fruit growing areas. Fruit is important mainly on the coastal lowlands of the west where there are vineyards, and orchards of citrus fruits, peaches, and apricots. There are also forests of Karri, a tree which produces useful building timber, especially in the south coast area around *Pemberton*.

Between the west and south coasts lies a roughly triangular area of plateau land with a plentiful rainfall. Here forests of slow-growing jarrah trees produce a hard timber which can resist attack by white ants and damp. It is widely used for railway sleepers. Apples are grown around *Bridgetown.*

Beyond the coastal and forest belts is an agricultural and pastoral belt of mixed farms.

Still further inland, reaching the west coast around Geraldton and the south coast east of Albany, is a drier belt where wheat is grown and sheep are grazed over wide areas.

The chief minerals of the south-west are bauxite which is worked in the Darling Range flanking Perth, coal which is mined around *Collie*, and copper at *Ravensthorpe.*

The larger towns of Western Australia are in the south-west. *Perth* (460,000), the capital, lies on the Swan River about twelve miles from its port, *Fremantle*—the first port of call in Australia for ships sailing from Colombo or Cape Town. Exports include wheat, wool, and gold. Nearby is the industrial centre of *Kwinana* with an oil refinery, an alumina refinery which processes local bauxite, and a large and developing iron and steel industry using ore from *Koolyanobbing*, west of Kalgoorlie.

*Geraldton* (12,100) lies on the coast north of Perth, and is connected to it by railway, and also to the Murchison goldfield inland. Its main exports are gold and wool. *Bunbury* is a port to the south of Perth, near to the Collie coalfield where coal is used to generate electricity. It has a plant producing titanium oxide from ilmenite, a mineral found in local beach sands.

*Albany*, on King George Sound, is a timber port. The largest inland town is *Northam* in the wheat belt.

THE DESERT AND SCRUBLAND of Western Australia consists mainly of a low plateau, rising to over 4,000 ft in the Hamersley Range. A few sheep graze on the scrub vegetation of the marginal areas and irrigation is possible where rivers from the plateau reach the coastal areas; around *Carnarvon*, for example, tropical fruits are grown, especially bananas.

Valuable minerals are found in many places. Gold mining has been carried on for many years. There are three main

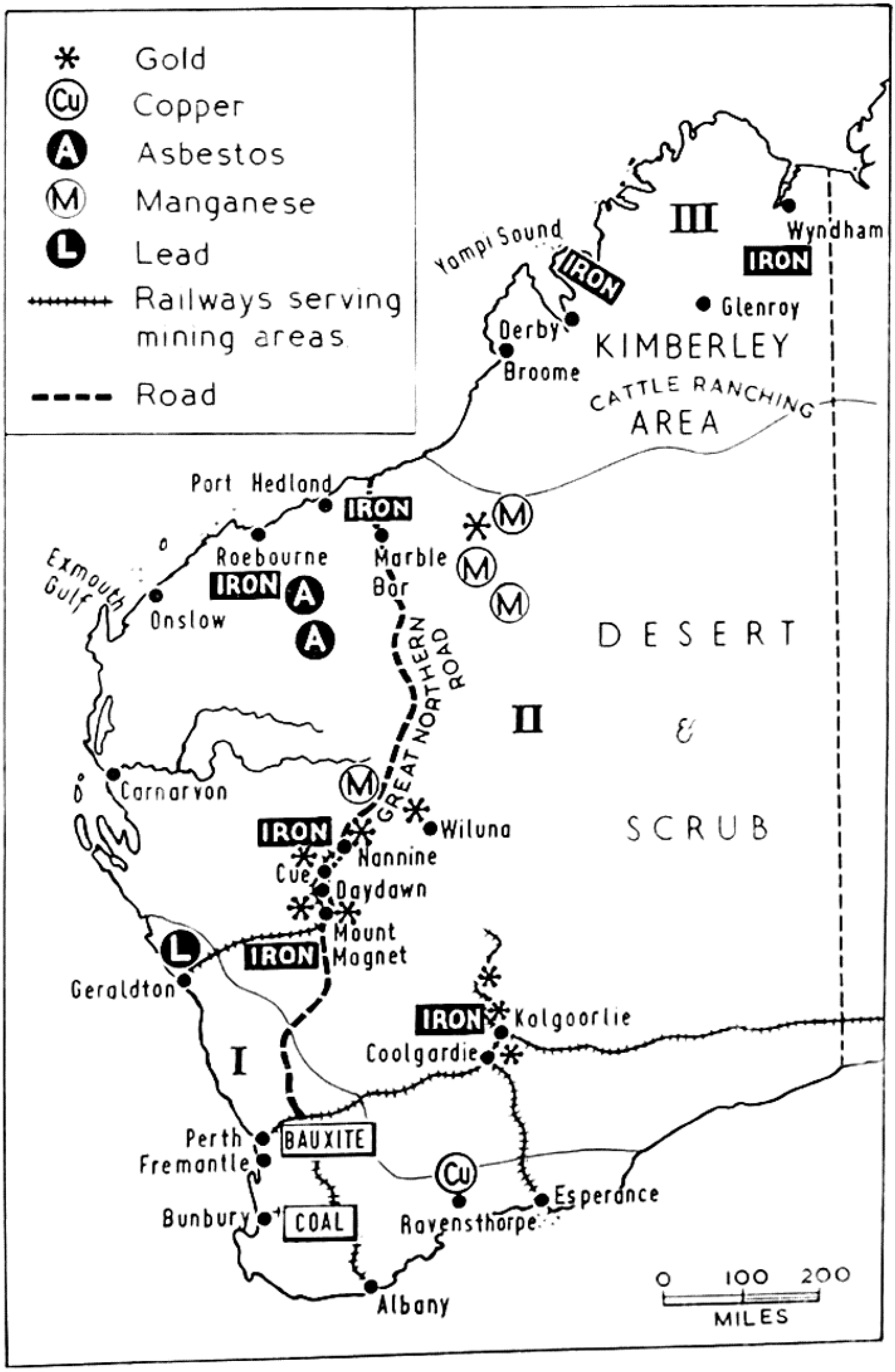


Fig. 72. WESTERN AUSTRALIA: MINERALS.

goldfields—the Pilbara goldfield west of *Marble Bar* in the north, the Murchison goldfield which embraces the small townships of *Mount Magnet*, *Daydawn*, *Cue*, *Nannine*, and *Wiluna*, served by a railway which runs inland from Geraldton; and the Coolgardie goldfield centred on the town of *Kalgoorlie* which, with its twin town of *Boulder*, forms the second largest centre in the state with a population of 22,000. Water for this area is pumped over 300 miles from the wetter district around Perth. Iron is mined west of Kalgoorlie and inland from Geraldton.

The northern parts of the desert have proved to be rich in minerals. Deposits are being developed in four main iron-fields in the Hamersley Range and railways are being built to link these with new harbours on the coast. Mount Goldsworthy, east of Port Hedland is already sending iron ore to Japan. Asbestos is mined south of Roebourne and manganese east of Marble Bar. The northern desert areas are linked with the south by the Great Northern Road which runs from Perth via Mount Magnet to Marble Bar.

THE TROPICAL GRASSLANDS of the north, with summer rain, extend over the Kimberley plateau which slopes towards the north coast which is fringed with rain forests. The grasslands are used for cattle raising (see pp. 284-5), and frozen beef is exported from *Wyndham* and *Derby*. *Broome* is a pearling centre and iron ore is quarried at Yampi Sound for export to the steel works of New South Wales.

The valley of the Ord River is irrigated to produce cotton and other crops.

### South Australia

South Australia is dry country: four-fifths of the state has an annual rainfall of less than ten inches. It can be divided into three main parts:

(i) The Great Victoria Desert and Nullarbor Plain;
(ii) The southern part of the Lake Eyre Basin of inland drainage.
(iii) The Mediterranean coastlands of the south-east.

THE DESERT REGION OF SOUTH AUSTRALIA is crossed by the trans-continental railway which links Kalgoorlie in

Western Australia with Port Augusta on Spencer Gulf. This is one of the loneliest stretches of railway in the world, through almost uninhabited country. Travelling east from Kalgoorlie, a belt of small gum trees extends for some 200 miles. Beyond this the rainfall is so slight that little vegetation survives except salt-bush which absorbs moisture from the dews. This is the streamless Nullarbor Plain across which the railway runs in a straight line until it reaches a waste of sand-hills. Beyond these dunes lies a district of "lakes" which, except after heavy rain, are no more than flat salt-pans.

The fact that this desert region is almost uninhabited has made it possible to establish an experimental centre for guided missiles in the arid rolling plains west of Lake Torrens and a few miles north of the trans-Australian railway line, based on the town of *Woomera*, a name derived from an aboriginal word meaning "throwing stick". The rocket range stretches north-westwards across the continent to the coast south of Broome, covering in all a tract of country larger than Great Britain. It may well become the first British centre for research into outer space and a launching ground for earth satellites.

Life in Woomera has its discomforts for day temperatures in summer rise as high as 49° C. (*120° F.*) in the shade, and at night it is cold enough for those who live there to welcome plenty of blankets and a hot water bottle. Water is brought to Woomera by pipe-line from Port Augusta.

THE LAKE EYRE BASIN is very sparsely peopled. Throughout the region the rainfall is slight—nowhere more than 10 in. per annum, and in many places less than 5 in. per annum. Cattle are grazed over large areas but there is not sufficient pasture to maintain many. Sheep are also kept. The interior is served by a railway which runs north from Port Augusta through Maree to Alice Springs in the Northern Territory. This forms an outlet for the grazing grounds.

*Marree*, to the south-east of Lake Eyre, is a collecting centre for cattle from the "Channel Country" (see pp. 284-5).

*Leigh Creek* is a mining town producing brown coal.

THE MEDITERRANEAN COASTLANDS are the populated part of South Australia and lie in the south of the state—in the Lake Eyre peninsula and south-east of Spencer Gulf. Here the annual rainfall, although light, is normally between 10 and 20 in. and good crops of wheat are grown (Fig. 70). Fruit is also produced, especially in the Renmark district where vineyards can be irrigated from the River Murray. This area is noted especially for wine-making and for dried fruits—currants and sultanas. In many places there are open plains of poor grass and scrub where sheep are grazed.

The wide estuary of the River Murray, which formerly ran through a number of salt lakes and several channels to reach the sea, has been spanned by a twelve-mile long barrage. Before this was constructed, the salt sea-water was often brought upsteam by wind and tide when the level of the river was low and this threatened to become more and more serious as increasing quantities of water were used in the upper reaches of the river for irrigation. Today, the barrage prevents this trouble, and the lakes near the mouth of the River Murray now store large quantities of fresh water so that it is possible to carry on dairy farming and cattle raising near the shores of the lakes, and many areas are irrigated for growing market garden crops for the city of Adelaide.

Between Adelaide and the borders of Victoria and in the west of Victoria itself lies a large expanse of land covered with broom, heath, and mallee known as the "Ninety-mile Desert". It has a rainfall of up to 20 in. per annum and artesian water is available, yet it has for years resisted all attempts at cultivation. Recent experiments, however, have shown that plants have failed in the soils of this region because they lacked certain "trace minerals"—small quantities of cobalt, copper, or zinc, for example. The addition of these, together with phosphate fertilisers, is now making it possible to grow excellent clover pastures and over half a million acres of what was formerly waste land are now being reclaimed for grazing and crops. An observer describes the operation as follows: "You see the 135 horse-power giant diesels bucking and roaring across the undulating plains, flattening the virgin scrub and tearing out the mallee. Two 50-ft logs coupled together and dragged by ship's anchor chains behind one of the most powerful tractors smash a 100-ft swathe in the scrub and trees like a reaper going through a crop. Next follow the tractor-drawn disc ploughs. They turn over 30 acres of the grey and white soil a day, carving up roots and mincing up the vegetation. For several months the land lies fallow. Then it is re-worked with smaller disc ploughs to receive the superphosphate and 'trace minerals'—in this case copper and zinc together—and for seed sowing."

South Australia is important for the mining of iron ore. The chief deposits are at *Iron Knob*, west of Spencer Gulf. The ore is sent to *Whyalla* (17,500) for export to the steelworks at Newcastle and Port Kembla on the Sydney coalfield in New South Wales. The ore ships return with coke which maintains steel furnaces in Whyalla, which also has the largest shipbuilding yards in the country. Although iron ore deposits are scattered widely over Australia, the high cost of transporting ore by land means that it is only worthwhile mining deposits near the coast.

Uranium ores are mined at Radium Hill, sixty miles south-west of Broken Hill, and at Myponga, close to Adelaide. Low-grade coal mined at Leigh Creek, some 100 miles north of Port Augusta, is used to generate electricity.

The towns of South Australia are mainly grouped in the south-east of the state.

*Adelaide* (608,000), the capital, is on the Torrens River, a few miles from St Vincent Gulf on which stands its port—Port Adelaide. Over 60 per cent. of the people of South Australia live within 20 miles of the centre of the city. It has an oil refinery and there are factories for making agricultural machinery and motor cars. It deals with most of the wheat, wool, and wine exports of the state.

*Elizabeth* (30,000) is a new industrial town some 17 miles north of Adelaide with many recent immigrants from Britain. It has factories making motor cars, sewing machines, and mattresses.

*Port Pirie* (15,600) has the largest smelting works for silver-lead ores in the world. The ores come mainly by rail from the mines at Broken Hill on the western borders of New South

Wales. It is also a wheat port, as is *Port Augusta* at the head of Spencer Gulf.

*Wallaroo* and *Moonta* on the eastern side of the Gulf are noted respectively for the manufacture of superphosphate fertiliser and the export of copper.

### Victoria

Victoria, the smallest and the most densely peopled state on the mainland, has prosperous farming areas producing wool, dairy produce, fruit, and wheat. It is also developing more rapidly as an industrial region than any other part of Australia.

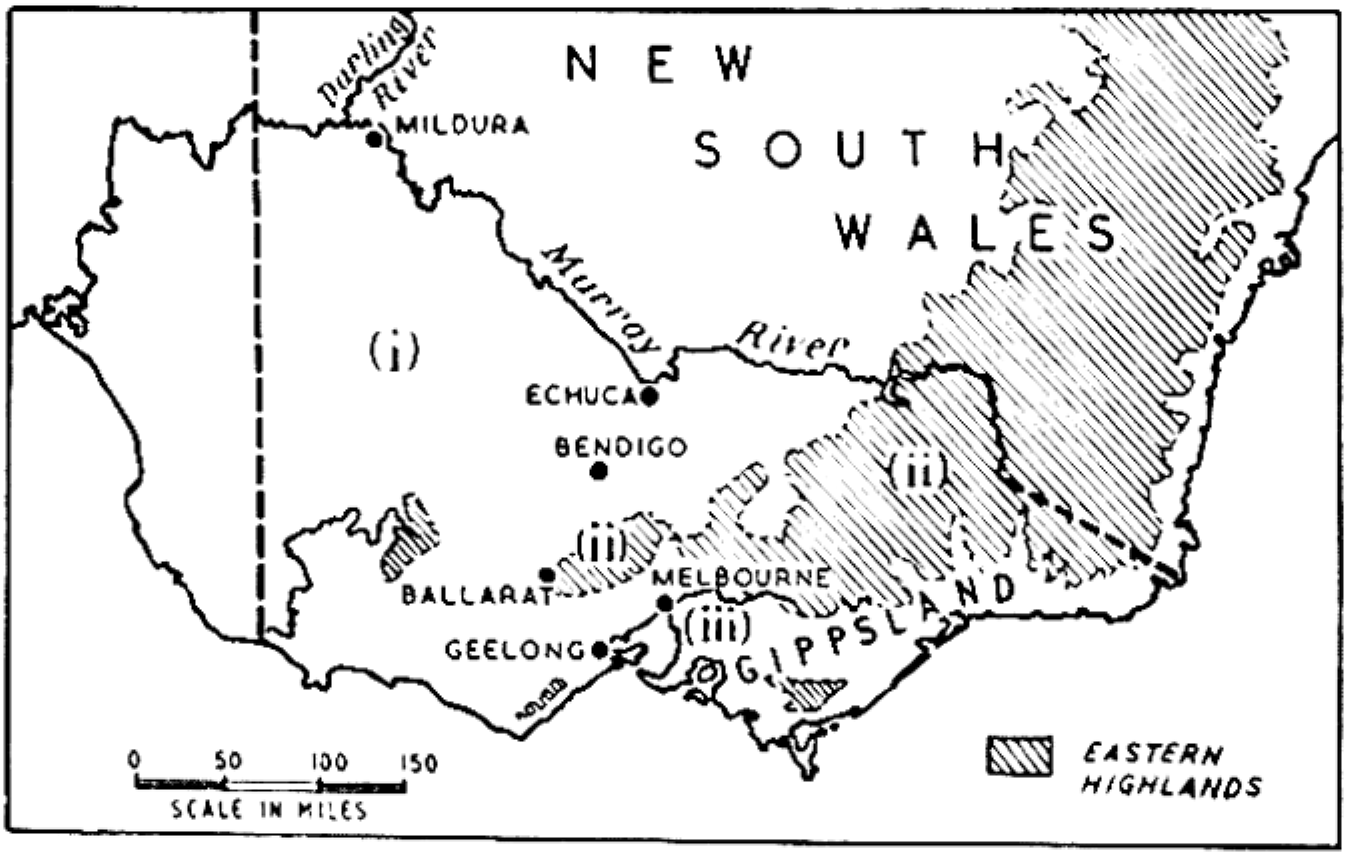


Fig. 73. Victoria: Natural Regions.

Victoria can be divided into three distinct parts (Fig. 73):—

(i) The lowlands of the north-west which form part of the Murray-Darling Basin;

(ii) The Eastern Highlands;

(iii) The lowlands of the south which include the Great Valley of Victoria and the Gippsland Basin.

THE LOWLANDS IN THE WEST OF VICTORIA which lie south of the River Murray have a relatively low annual rainfall and crops depend in many places on the provision of water for irrigation, though wheat grows well in many areas. Water for irrigation must be carefully conserved, for although the rivers flow strongly at some periods, at other times they shrink to a mere trickle.

Irrigation has been carried on in Victoria for a long period; the earliest irrigation areas, first established last century, are in north Victoria where small tributaries enter the River Murray at *Echuca* and at *Mildura.*

In some places river water is run into "tanks", or earthen storage hollows on the farms, which are filled once a year, usually during the winter. This is done in the Mallee District of western Victoria.

The state also benefits from the major irrigation schemes in the Eastern Highlands where tributaries of the River Murray have been dammed. This makes it possible to regulate the flow of water in the main river.

Most of the irrigated areas in Victoria grow fruit. Peaches, apricots, and pears, are grown for export, and there are vineyards around Mildura which produce grapes for drying. Raisins, currants, and sultanas are prepared here—also for export.

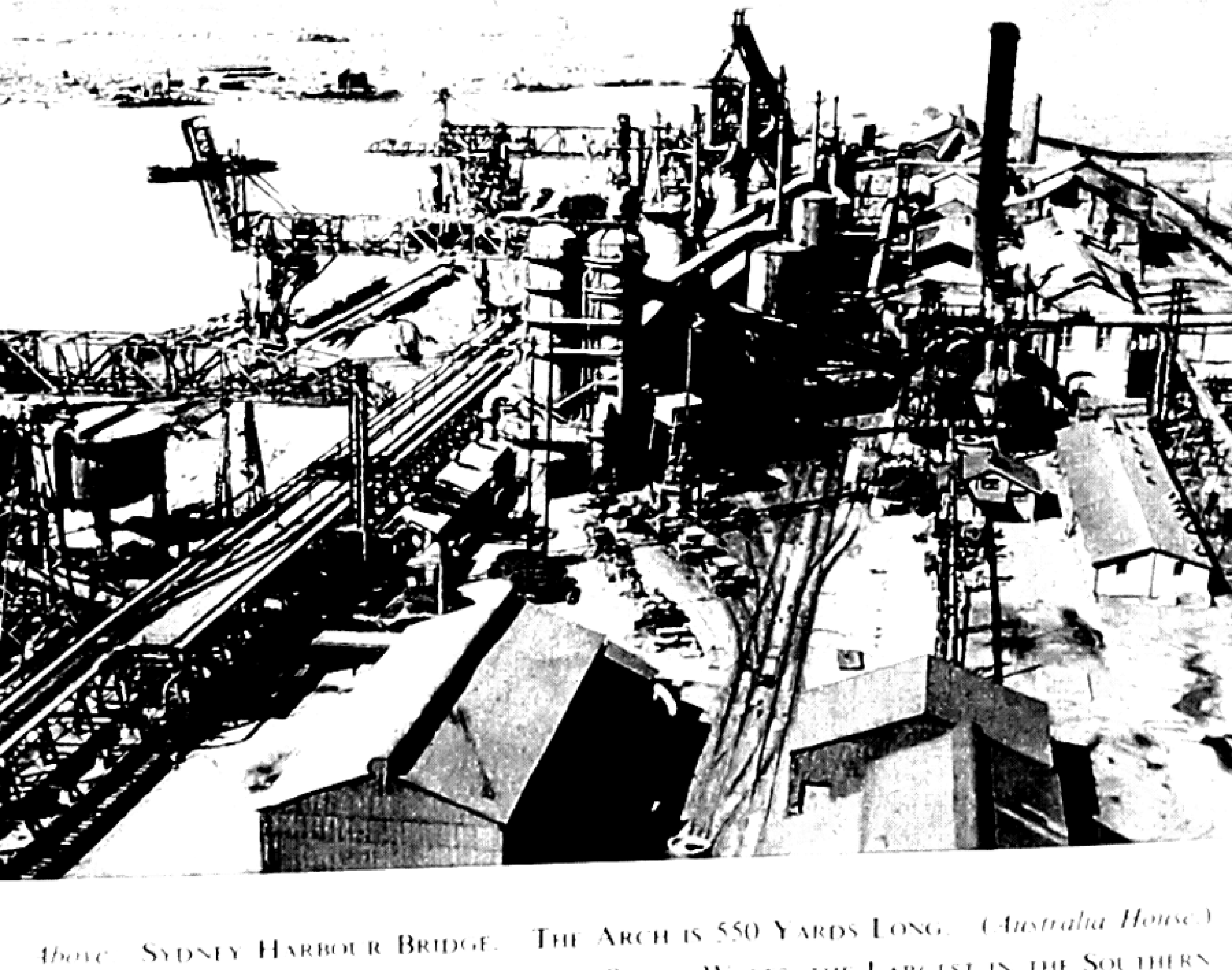
THE EASTERN HIGHLANDS OF VICTORIA, which include the Australian Alps in the east of the state, are mainly wooded. There are fine forests of mountain ash which is used for paper making and also for various types of interior decoration. In the valleys of the River Murray and the River Goulburn red gum trees are cut down for making railway sleepers. But it is for minerals that the highlands are mainly important. Indeed, the existence of gold in the rocks played a significant part in the development of Australia, attracting immigrants who stayed in the country when the "gold rushes" were over. The population of Victoria in 1850 was 71,000. In 1851 gold was discovered. By 1890 the population had risen to one million. The old gold-mining centres include *Ballarat* (56,500), now the largest inland city in Australia, and *Bendigo* (42,000). Both these cities have become important centres for commerce and industry.

The swift rivers of the highlands provide potential sources of power and at Kiewa in north-east Victoria there are hydro-electric schemes.

THE GREAT VALLEY OF VICTORIA has winter rain and is an area of mixed farming, growing cereals and grazing cattle

*Above.* SHEARING SHEEP WITH POWER-DRIVEN CLIPPERS. A GOOD SHEARER CAN CLIP OVER 100 SHEEP IN A DAY. (*Australia House.*)

*Below.* THERE ARE BETWEEN 8,000 AND 9,000 SUGAR-CANE FARMS IN THE COASTAL AREAS OF QUEENSLAND. ONLY WHITE LABOUR IS EMPLOYED. (*Australia House.*)



*Above* Sydney Harbour Bridge. The Arch is 550 Yards Long. (*Australia House.*)

*Below* Steelworks at Newcastle, New South Wales, the Largest in the Southern Hemisphere. (*Australia House.*)

and cross-bred sheep—mainly for mutton and lamb. The Gippsland Basin is rather wetter and is particularly suitable for dairy farming. Victoria is the most important state in Australia for dairy produce, producing more butter than any other part, and quantities of condensed and powdered milk.

Some parts of southern Victoria are still clothed with the natural vegetation of eucalyptus and kauri forest and in many places the trees are felled for timber.

In Victoria brown coal is cut in the Latrobe valley around Yallourn, 80 miles east of Melbourne. It occurs near the surface and the opencast workings resemble enormous quarries. This brown coal is used to generate electricity for distribution all over the state. It is also used for producing gas which is piped to Melbourne.

*Melbourne* (2,004,000) is the second largest city of Australia, the capital of Victoria, and a natural centre for the road, rail, and air routes which converge upon it from all over the state. It stands on the Yarra River at the head of Port Phillip Bay, a large, shallow inlet with a narrow entrance from Bass Strait. Large passenger liners berth at Port Melbourne, and there are docks and wharves along the Yarra River from which wheat, wool, butter, meat, gold, and wine are exported. Melbourne is also a great industrial centre with important woollen and nylon mills and a fine system of electric railways.

*Altona*, on the western outskirts of Melbourne, has important petro-chemical industries, using by-products from oil refineries.

*Geelong* (96,500), Victoria's second port, lies south-west of Melbourne on an offshoot of Port Phillip Bay. It is an industrial centre with mills for spinning and weaving wool, factories for making motor cars, tractors, and agricultural machinery, an oil refinery, and an aluminium smelter. Brown coal is used to generate electricity. It exports agricultural produce, especially wool from the rich southern farmlands of Victoria.

### New South Wales

New South Wales has the largest population of any state in Australia with over four million people, and the largest number of sheep—over seventy-two million.

The state may be divided into three main parts:

(i) The Coastal Lowlands, (ii) The Eastern Highlands, and (iii) The Western Plains.

THE COASTAL LOWLANDS of New South Wales receive a good rainfall at all seasons and the natural vegetation is forest. Over much of the land, especially along the river valleys, the forest has been cleared for farming, especially dairying. Milk, cream, cheese, and vegetables are produced for the larger towns and cities. Citrus fruits, especially oranges, are grown in the Paramatta district near Sydney.

Coal is found in many places along the eastern side of the Great Dividing Range. By far the most extensive workings are in a basin around Sydney. Coal crops out on the surface north, west, and south of the city and is mined at Newcastle, Lithgow, and Bulli. Much coal is now exported.

*Sydney* (2,300,000) is the capital of New South Wales and the largest city of Australia. Sydney Harbour covers an area of twenty-two square miles and around the shores are bays and coves with residential areas and pleasure beaches linked by ferry services. The city itself is crowded with skyscrapers and the great Harbour Bridge, which dominates the scene, carries four electric railway lines. The harbour itself is deep enough for the largest ships and serves the most important industrial area in Australia. Exports include wool, wheat, coal, lead, and butter.

*Newcastle* (220,000), just over 100 miles north of Sydney, is an important port and coal-mining centre with large steelworks. It serves the farming and fruit-growing districts of the Hunter Valley. *Port Kembla*, sixty miles south of Sydney, has a rapidly expanding steel industry, copper refineries and tin-plate mills. *Lithgow*, another steel town, is fortunate in having local deposits of iron ore. There is a large oil refinery at *Kurnell* on Botany Bay.

THE EASTERN HIGHLANDS rise steeply from the coastal lowlands and slope away much more gradually to the west. On the western slopes wheat and barley are grown, and sheep and cattle find good grazing on the upland pastures. Elsewhere the land is forested with hardwood trees.

Many of the tributaries which feed the Murray and Darling rivers which flow across the plains to the west rise in the highlands. However, since the rain-bearing winds blow from the eastern side, much of the water flows away to the Pacific in short, swift streams. Work is now going ahead to reverse the flow of the headwaters of the Snowy River which rises in the south of New South Wales to provide water for irrigation on the dry inland plains and hydro-electricity for a large area. A long tunnel will take the water through the Snowy Mountains to the River Murray. This tunnel will be over 3,500 ft above sea level and 1,800 ft below ground. A tributary of the Snowy River has been diverted into the Tumut River, a tributary of the Murrumbidgee. The result of this "Snowy Mountains Scheme" will be to increase generating power for electricity to supply the needs of Victoria and New South Wales, and to provide water to irrigate land for 2,500 new farms.

Existing dams which control the flow of water in the River Murray include the Hume Dam (near Albury) and the Burrinjuck Dam on the River Murrumbidgee above Wagga-Wagga.

Gold is obtained from the highlands at Bathurst and Mudgee.

*Canberra* (75,000), deliberately planned as the Federal Capital of Australia, is nearly 2,000 ft above sea level in the mountains. Although entirely surrounded by New South Wales, it lies outside all the Australian states in Australian Capital Territory. It has grown from 10,000 to 75,000 people in ten years and contains Australia's National University, an important centre for learning and research.

THE WESTERN PLAINS of New South Wales are covered with grass and scrub vegetation. Sheep are kept over nearly the whole region. In some places water is obtained from artesian wells; elsewhere from the rivers.

Between the Murray and Murrumbidgee—a district known as the Riverina—farming is more intensive and crops, including fruit, are grown under irrigation.

In the drier areas to the north and west there are some mining centres. Copper is obtained at *Cobar*; silver, lead, and zinc are mined on a large scale at *Broken Hill* (34,000) in the west of New South Wales. Broken Hill is linked by rail with Sydney, and with Port Pirie in South Australia where the ores are smelted.

### Queensland

The natural regions of Queensland are similar—physically—to those of New South Wales. The state may be divided into the western plains, the uplands, and the coastal lowlands.

THE UPLANDS of Queensland, which form part of the Great Dividing Range, are much lower than the corresponding highlands to the south in the state of New South Wales. They are well wooded in many parts, especially on the wetter, eastern slopes, and they yield rosewood and mahogany used for making furniture, and the most useful of Australia's soft woods—the hoop pine. To the west the forests thin out and merge into the open savanna grasslands of the interior. These WESTERN PLAINS are cattle grazing lands (see pp. 283-4) and *Longreach* and *Charleville* are cattle collecting centres linked by railway with the east coast ports.

Both the uplands and the western plains are rich in minerals. *Mount Isa* (16,000), 600 miles inland from the port of Townsville, is the centre of an important mining area yielding copper, silver, lead, zinc, and uranium. Copper is the most important mineral and is obtained from open-workings and underground mines. Only very rich ore deposits could justify workings so far from the coast, from coal, and other essential supplies. Mount Isa is very prosperous: it has a higher proportion of cars—and children—than anywhere else in Australia.

There are many other flourishing mining areas in Queensland—uranium oxide is produced at *Mary Kathleen*, tin at *Herberton*, copper and gold at *Mount Morgan*, and copper at *Cloncurry*. Bauxite is worked at *Weipa* on the western side of the York Peninsula, providing raw material for the smelter at Bell Bay in Tasmania (p. 304). Some is also shipped to a refinery on the coast at *Gladstone*, and there is an export to Japan.

THE COASTAL LOWLANDS are hot and wet. In many parts maize is grown, much of it used for feeding horses. In the tropical areas between Mackay and Cairns, where there is a rich soil, sugar cane is grown. Most of the 9,000 cane farms, some of which are irrigated, are quite small and are worked with European labour, often by members of a single family. The Government encouraged the industry by setting up crushing mills with a view to expansion, since it is considered important to develop the tropical areas of Australia to the full. In recent years the sugar industry has flourished and new areas have been planted. This is partly due to a world sugar shortage and the expansion of markets in the U.S.A. and Japan. More than half the sugar is exported, much of it to Britain.

Cotton is grown behind the low coast range from the New South Wales border to Rockhampton, up to about 150 miles inland. The quality is not first rate and development is limited by lack of suitable labour. Oil mills convert the cotton seed into cattle food. At one time raw cotton was exported but the whole crop is now used for manufacturing in Australia, though it only meets a small fraction of the industry's requirements.

In the south of Queensland, near the border with New South Wales, bananas are grown in the coastal areas. Further north there are plantations of pineapples.

Dairying is important on the rich pastures of the coastal plains and butter is produced for export.

Coal mining is increasing in importance in Queensland. It has been mined for a considerable time along the coastal plain in the Rockhampton and Maryborough districts, and also at Ipswich, inland from Brisbane. At *Moura*, *Blair Athol*, and *Collinsville* excellent coking coal is worked on the surface. The Moura coal is exported through Gladstone to Japan.

A large oilfield at *Moonie* in south-east Queensland is Australia's chief source of petroleum. There are smaller oilfields at Alton, Richmond, and Roma to the west of Moonie. A pipeline carries the crude oil to a refinery at Brisbane.

The chief towns of Queensland are ports on the east coast from which railways run inland, bringing farm produce and minerals to the coast for export.

*Brisbane* (650,000), the capital and chief port, is in the south of Queensland at the mouth of the Brisbane River. It forms an outlet for the Darling Downs and for the mineral areas inland; exports include wool, mutton, beef, copper, and tin. Industries include shipbuilding, engineering, and the manufacture of textiles.

*Ipswich* (51,000), on the west of Brisbane, has the largest coalfield in Queensland, and has woollen mills, engineering works, and butter factories.

*Toowoomba* (52,000), on the high land still further west, is the centre of a wheat-growing and dairying district and collects produce from the Darling Downs.

*Rockhampton* (45,000) provides an outlet for the gold mines at Mount Morgan and for the cattle collected far inland at Longreach. *Townsville* (54,000) exports sugar from the coastal plantations and minerals from Mount Isa; *Cairns* (26,000) and *Mackay* (22,000) are sugar ports. A railway along the coastal plain links Brisbane with Cairns, passing through the ports of Rockhampton and Townsville. *Gladstone*, 300 miles north of Brisbane, has an aluminium smelter using bauxite from Weipa (p. 300).

### The Northern Territory

The Northern Territory of Australia is administered by the Commonwealth Government and has a population of under 50,000, of whom about 19,000 are full-blooded aboriginals. They are naturally nomadic people and often find it difficult to settle in one place, but efforts are being made to provide an education for their children.

It has a fairly heavy monsoon rainfall in the north and inland where the rainfall decreases there are tropical grasslands used for cattle rearing. A little rice is grown near the coast.

*Darwin* (13,000), the capital, administrative centre, and chief port, has an important airfield, the first call in Australia for long-distance planes from Europe and Asia. It has a long established Chinese community and its trade with Asia will probably grow. For residents the main problem is the heat. This accounts for Darwin's main industries—two breweries and an ice-cream factory. A railway runs south from Darwin to Birdum. Some 100 miles south of Darwin a mine at Brock's Creek produces pitch-blende which yields uranium, the main source of atomic power. Production, however, has declined with a drop in demand. Iron, bauxite, manganese, lead, and other minerals have also been found in the Northern Territory.

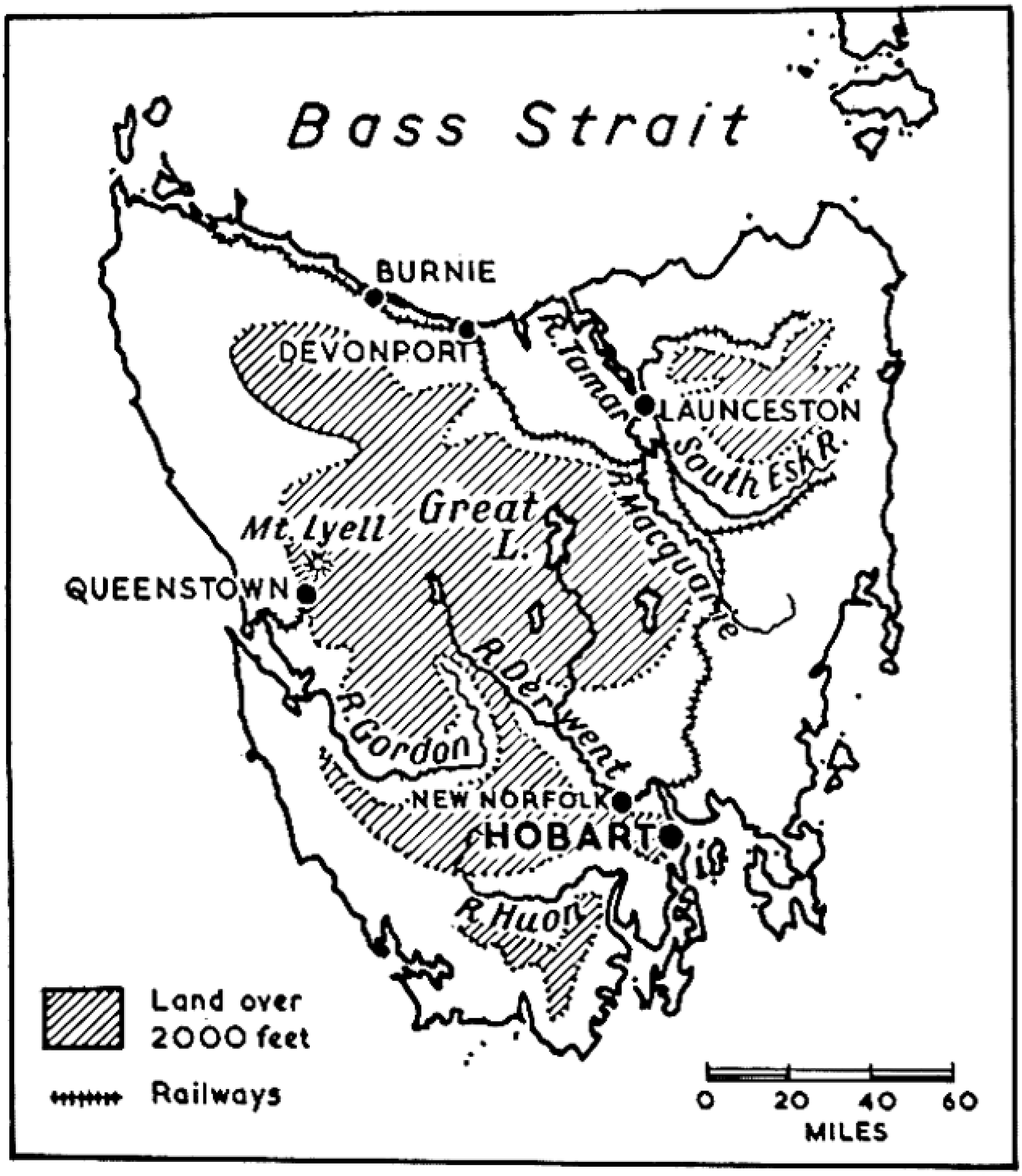


Fig. 74. TASMANIA.

The railway from Darwin is linked with a railway running north from Adelaide to Alice Springs by the Stuart Highway, sometimes called "The Track" or "The Bitumen". On this road lies the copper and gold-mining centre of Tennant Creek.

*Alice Springs* (3,000), in the south of the Northern Territory, is in the Macdonnell Range, some 2,000 ft above sea level.

It serves as a cattle collecting centre, and attracts increasing numbers of tourists.

### Tasmania

Tasmania is a mountainous island in the belt of the westerly winds and therefore has rain all the year round. The rainfall on the western side is particularly heavy. Much of the country is heavily wooded. The abundance of water in the short, swift streams and rivers makes it possible to produce hydro-electricity very cheaply and this is used in Tasmanian industries. The central plateau is dotted with lakes and the largest, the Great Lake, covers fifty-eight square miles. The chief power stations are on the rivers which drain to the south-east, carrying the overflow from the lakes, but there is a generating station in the Tamar Valley near Launceston.

Farming in Tasmania differs considerably from the warmer but often drier lands of the other states. The heavy rainfall encourages the growth of lush grass and dairying is important, with hardy merino sheep on the hill slopes which produce an excellent wool. Wheat does not grow well and most of the wheat for Tasmania is imported. But oats and potatoes flourish and potatoes are a major export—mainly to New South Wales and Queensland. Hops are grown in the Derwent Valley. It is, however, for apple growing that Tasmania is famous; the "Apple State", as it is sometimes called, produces more than half Australia's apple crop. They are grown in many places but especially in the Huon and the Derwent Valleys, where pears, plums, peaches, and apricots are also produced.

The mountains contain useful mineral ores. Copper is obtained from the Mount Lyell mine at Queenstown on the western side of the island—one of the largest copper mines in the world—wolfram at Storey's Creek in the north-west, and scheelite on King Island.

Fishing flourishes around the coast of Tasmania and crayfish and tuna are canned for export.

An aluminium smelter at Bell Bay near the mouth of the Tamar River, deals with bauxite brought from Weipa in Queensland (p. 300), using hydro-electric power from the mountain streams. There is also a large newsprint mill at

Boyer, near New Norfolk, which pulps eucalyptus wood and supplies material for Australian newspapers.

Most of Tasmania's towns are on, or near, the coast.

*Hobart* (124,000), the capital and chief port, is on the south bank of the River Derwent and has a first-rate, deep-water harbour, one of the finest in the world. At one time, as the nearest port to Antarctic waters, it was a whaling base and in 1850 as many as forty ships were fitted out in Hobart for the season. Today it serves as the port for a rich hinterland producing fruit, wool, hides, mineral ores, and timber. There are iron foundries, weaving mills, and a pulp plant preparing newsprint from eucalyptus wood. Fruit is made into jam. Hobart is also a favourite holiday resort for visitors from the Australian mainland.

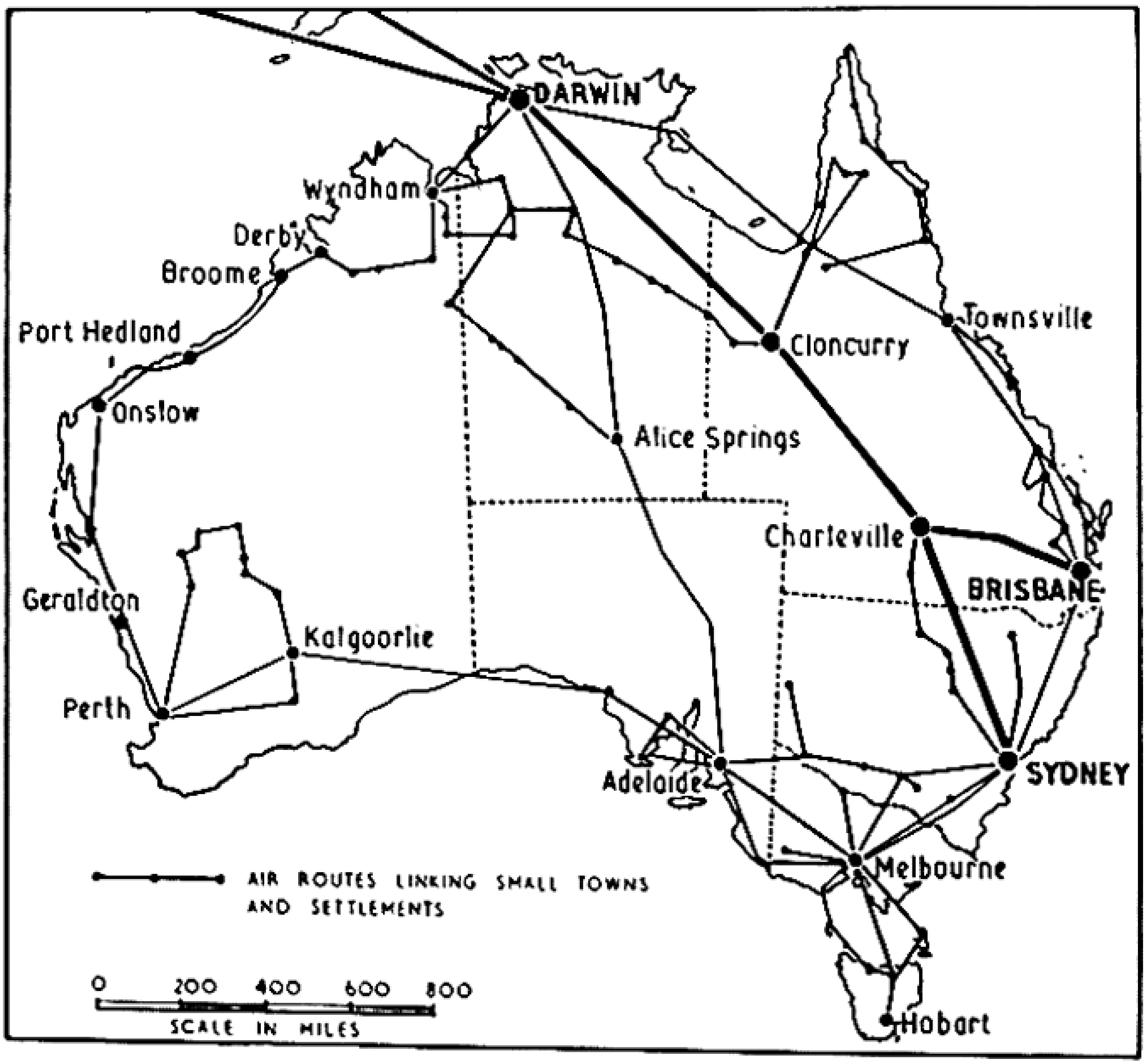


Fig. 75. Australia: Main Air Routes.

*Risden*, near Hobart, has large works extracting zinc, by an electrical process, from ore brought from the Broken Hill district of New South Wales. This is another good example of an industry founded on abundant and cheap power supplies.

*Launceston* (59,200), in the north of Tasmania on the River Tamar, forty miles from the sea, is the second largest city and the chief industrial centre. It is a focus for road, rail, and air routes. The chief railway links Launceston with Hobart, winding through valleys and over passes.

*Burnie* (15,000) and *Devonport* (13,500) are deep-water ports serving the mining and farming areas of the north and west. Their main trade is with the mainland. Burnie has a plywood factory and mills for producing paper from hardwoods.

**Transport**

Before the creation of the Australian Commonwealth, each state had developed its own railway system, and railways have always been the most important form of transport in the development of Australia. Very many of the most important lines run inland from the ports and bring the produce of the interior to the coast for export.

Coastal shipping is of great value. The following regular services link the isolated ports round the coast:—

(i) Fremantle — Adelaide — Melbourne — Sydney — Brisbane.

(ii) Brisbane—Mackay—Townsville—Cairns.

(iii) Fremantle — Port Hedland — Broome — Derby — Wyndham—Darwin.

There are also regular steamship services between Melbourne and Burnie in Tasmania, and between Sydney and Hobart.

In the remote parts air transport is essential. It is impossible for every small settlement to have its own doctor. To overcome this difficulty a radio network has been established so that isolated families in the Australian Bush can keep in touch with one another and with their doctor who can fly by plane to urgent cases. Young children are also taught by radio.

Regular air services link all the state capitals and many of the larger towns (see Fig. 75), and long-distance planes arrive regularly at Darwin on their way to Sydney or Adelaide. Services between Adelaide and Darwin via Alice Springs are sometimes interrupted by dence clouds of red dust—"tomato soupers" as the pilots call them—which blow across the desert areas.

### Trade

The chief exports of Australia for the year 1963-64 are given below. Values are in Australian pounds to the nearest million (£A125 = £100 sterling).

| | | | |
|---|---|---|---|
| Wool | 481 | Hides and skins | 46 |
| Wheat and flour | 202 | Fruits (fresh, dried, and canned) | 45 |
| Meat (mainly tinned) | 122 | Butter, milk, and cream | 36 |
| Sugar (cane) | 78 | | |

Australia is looking more and more to trade with the countries of Asia. Japan is now her largest customer, buying increasing quantities of metals, coal, iron ore, and wool. Britain holds second place with considerable wool imports. Indeed, wool is nearly as important to Australia as all the other exports together. It is sometimes said that Australia "lives off the sheep's back". In recent years China has taken wheat and the U.S.A. meat.

The chief Australian imports for the year 1963-64, valued in millions of Australian pounds, were:

| | | | |
|---|---|---|---|
| Motor-cars and parts | 118 | Electrical equipment | 59 |
| Petroleum and oils | 117 | Stationery and books | 26 |
| Chemicals and drugs | 82 | Paper and printing | 23 |
| Textiles and yarns | 68 | Timber | 18 |
| Machinery | 64 | Tobacco | 13 |

Roughly one-third of the imports come from Britain. The U.S.A. (mainly petroleum), Western Germany, Japan, and Canada provide most of the remaining imports.

# CHAPTER XIX

## NEW ZEALAND: INTRODUCTORY

### Position

New Zealand lies in the South Pacific Ocean about as far south of the Equator as Italy is north. The voyage from Britain via the Panama Canal is over 11,000 miles; it is 6,000 miles by sea from South America to New Zealand, and 1,200 miles by sea from Australia, the nearest neighbour. Despite this isolation the ties between New Zealand and Britain, the country of origin of most of her people, are still very strong.

### Relief

New Zealand consists of two main islands separated by the twenty-mile wide Cook Strait—North Island and South Island. The distance from the north of North Island to the south of South Island is over 1,000 miles.

The backbone of New Zealand is a series of fold mountains, part of the great sweep of ranges encircling the Pacific Ocean. More than three-quarters of the country is over 650 ft above the sea, and as many as seventeen peaks rise to over 10,000 ft. The main ranges run from south-west to north-east.

In South Island, where the mountains are known as the Southern Alps, they rise steeply from the west coast and slope away more gently to the east where there are lowlands—the Canterbury Plains. The highest peak of the Southern Alps is Mount Cook (12,349 ft) or, to give it its Maori name, Aorangi, the Cloud Piercer. Everywhere the mountains provide magnificent scenery; many of the valleys are dammed by glacial moraines and are filled with beautiful lakes which spill over into swift rivers, some of which have been harnessed to provide electricity. In the south-west the mountains descend to steep-sided fiords such as Milford Sound. The Southern Alps form, at the same time, a formidable barrier to transport. Only in one place are they crossed by railway—at Arthur's Pass, north-west of Christchurch.

In North Island the mountains are lower and are broken up into several distinct ranges and plateau areas. The main series of ranges, which stretches from near Wellington to East Cape, does not rise above 6,000 ft and the low hills of the Auckland Peninsula swing out from south-east to

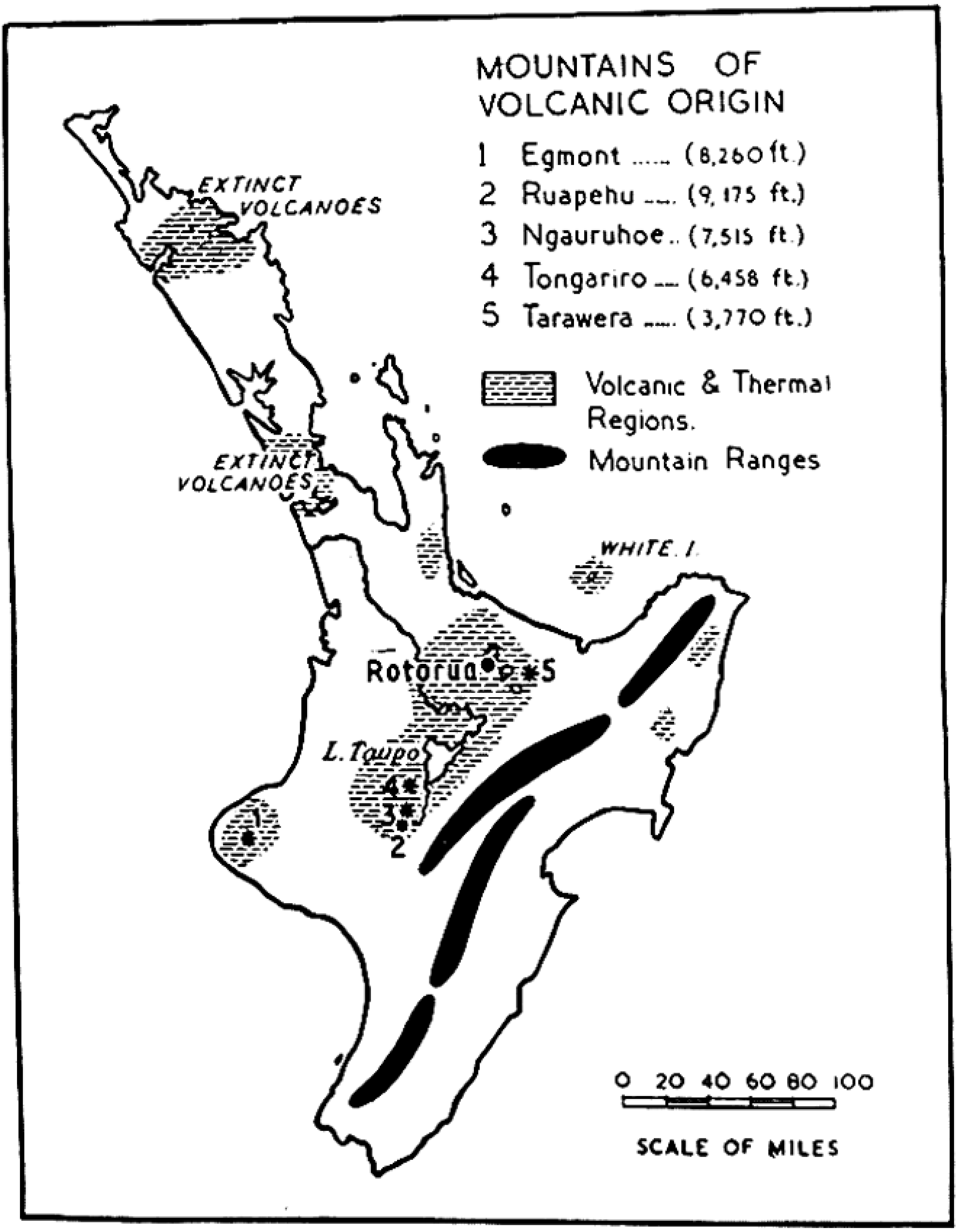

MOUNTAINS OF VOLCANIC ORIGIN
1 Egmont ...... (8,260 ft.)
2 Ruapehu ..... (9,175 ft.)
3 Ngauruhoe .. (7,515 ft.)
4 Tongariro .... (6,458 ft.)
5 Tarawera ..... (3,770 ft.)
Volcanic & Thermal Regions.
Mountain Ranges
EXTINCT VOLCANOES
EXTINCT VOLCANOES
WHITE I.
Rotorua
5
L. Taupo
4
3
2
1
0 20 40 60 80 100
SCALE OF MILES

Fig. 76. North Island, New Zealand: Volcanic and Thermal Regions.

north-west. Between these, in the centre of North Island lies a volcanic region with several high volcanic peaks, some of which are still active, *e.g.* Ruapehu, Ngaurahoe, and Tongariro. The Rotorua district, north of Lake Taupo, also shows signs of thermal activity; there are hot springs, boiling mudpools, and geysers which at regular intervals eject columns of boiling water and steam. In the south-west of North Island rises the perfect volcanic cone of Mount Egmont, now extinct. Earthquakes are frequent in North Island, and from time to time are serious enough to destroy life and property.

The major rivers of North Island, the Waikato and Wanganui, rise on the central plateau and flow across fertile lowlands to the sea. In their lower reaches they are used by small steamers.

## Climate: Temperature

New Zealand has an oceanic climate, without great extremes of temperature, which is similar in many ways to that of Britain. This may be seen from the following temperature figures for the four main cities:—

| | JANUARY | JULY | RANGE |
|---|---|---|---|
| Auckland | 19° C. (*67° F.*) | 11° C. (*52° F*). | 8 C°. (*15 F°.*) |
| Wellington | 17° C. (*62° F.*) | 9° C. (*48° F.*) | 8 C°. (*16 F°.*) |
| Christchurch | 17° C. (*62° F.*) | 6° C. (*42° F.*) | 11 C°. (*20 F°.*) |
| Dunedin | 14° C. (*58° F.*) | 6° C. (*42° F.*) | 8 C°. (*16 F°.*) |

In winter the west coast tends to be warmer than the east owing to the warm East Australian Current. In summer, however, the east coast is warmer since the westerly winds blow over the warm land before reaching the Canterbury Plains. In North Island frost is seldom experienced in the lowlands and near the coasts.

## Climate: Rainfall

New Zealand lies almost entirely within the belt of the westerly winds throughout the year, though the Auckland peninsula does come under the influence of the south-east trade winds for a short period in summer when the wind belts have moved south.

In South Island, the westerly winds bring heavy rainfalls of between 100 and 200 in. to the west coast as they rise over the Southern Alps, and snow falls heavily on the mountains. East of the mountains, on the Canterbury Plains, it is much drier with between 20 and 30 in. of rain. Unfortunately it falls mainly during summer when evaporation is rapid, especially when the north-west winds blow warm and dry ("föhn" winds) from the Southern Alps.

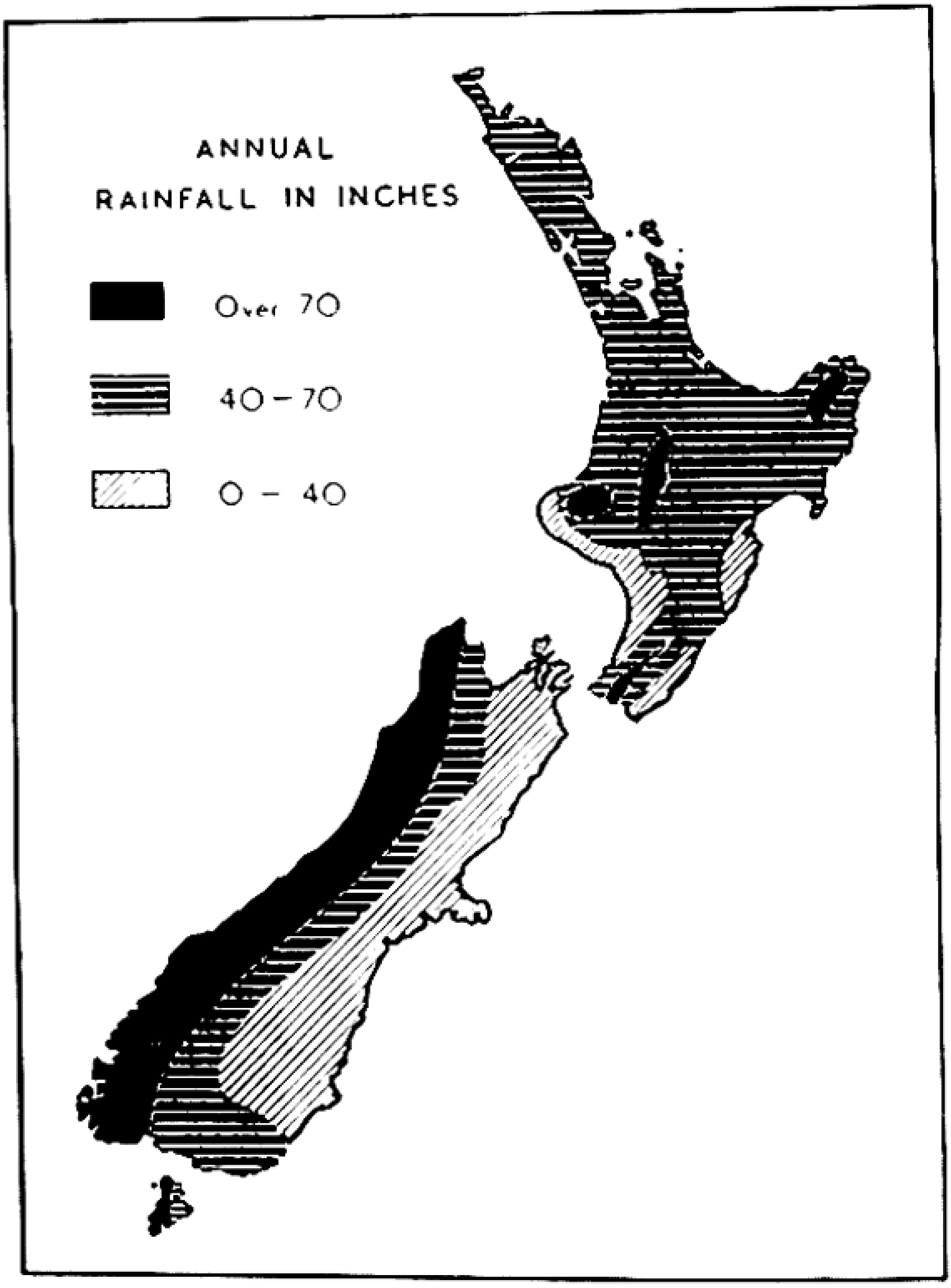


Fig. 77. New Zealand: Distribution of Rainfall.

In North Island the rainfall is much more evenly distributed with the heaviest falls in winter. Nowhere is there a marked dry season.

The differences in annual rainfall and in seasonal distribution are well seen in the following rainfall figures, given in inches:—

| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Auckland (North I.) | 3·5 | 3·1 | 2·7 | 3·1 | 4·6 | 5·0 | 5·1 | 4·2 | 3·7 | 3·5 | 3·4 | 2·8 | 43·7 |
| Hokitika (W. coast, South I.) | 8·6 | 8·0 | 9·8 | 8·4 | 11·0 | 10·0 | 9·4 | 8·7 | 9·0 | 11·1 | 9·6 | 11·5 | 115·1 |
| Dunedin (E. coast, South I.) | 3·2 | 2·3 | 2·6 | 2·7 | 3·4 | 3·0 | 2·9 | 3·5 | 2·4 | 2·4 | 2·9 | 3·3 | 34·6 |

## Vegetation and Animals

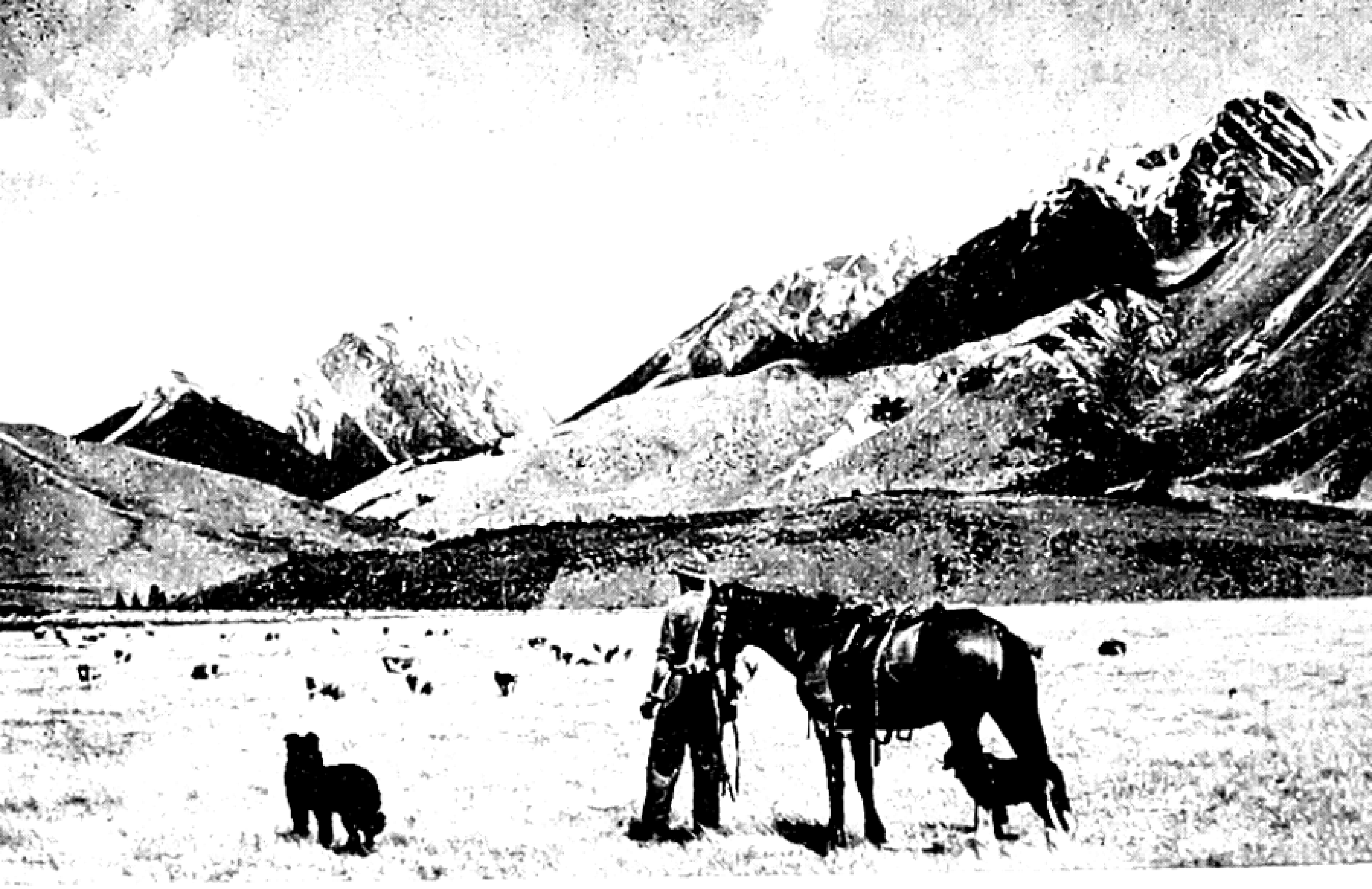
Over the greater part of New Zealand, especially where the rainfall is heavy, forests grow naturally, though in large areas the trees have now been cleared for farming. The forest is known locally as the "bush" and consists mainly of evergreen trees, giant tree ferns, and creepers. In the warmer North Island, which was originally completely forested, the trees yield good timber, especially the kauri pine which is restricted to the Auckland peninsula. Fossilised gum from this tree is still dug from the ground on the sites of the old forests and is used for making polishes and varnish. Another native plant grows well in the wetter low-lying parts of New Zealand, especially in the Auckland peninsula. This is phormium or New Zealand flax, a kind of hemp with large leaves, yielding a fibre similar to flax.

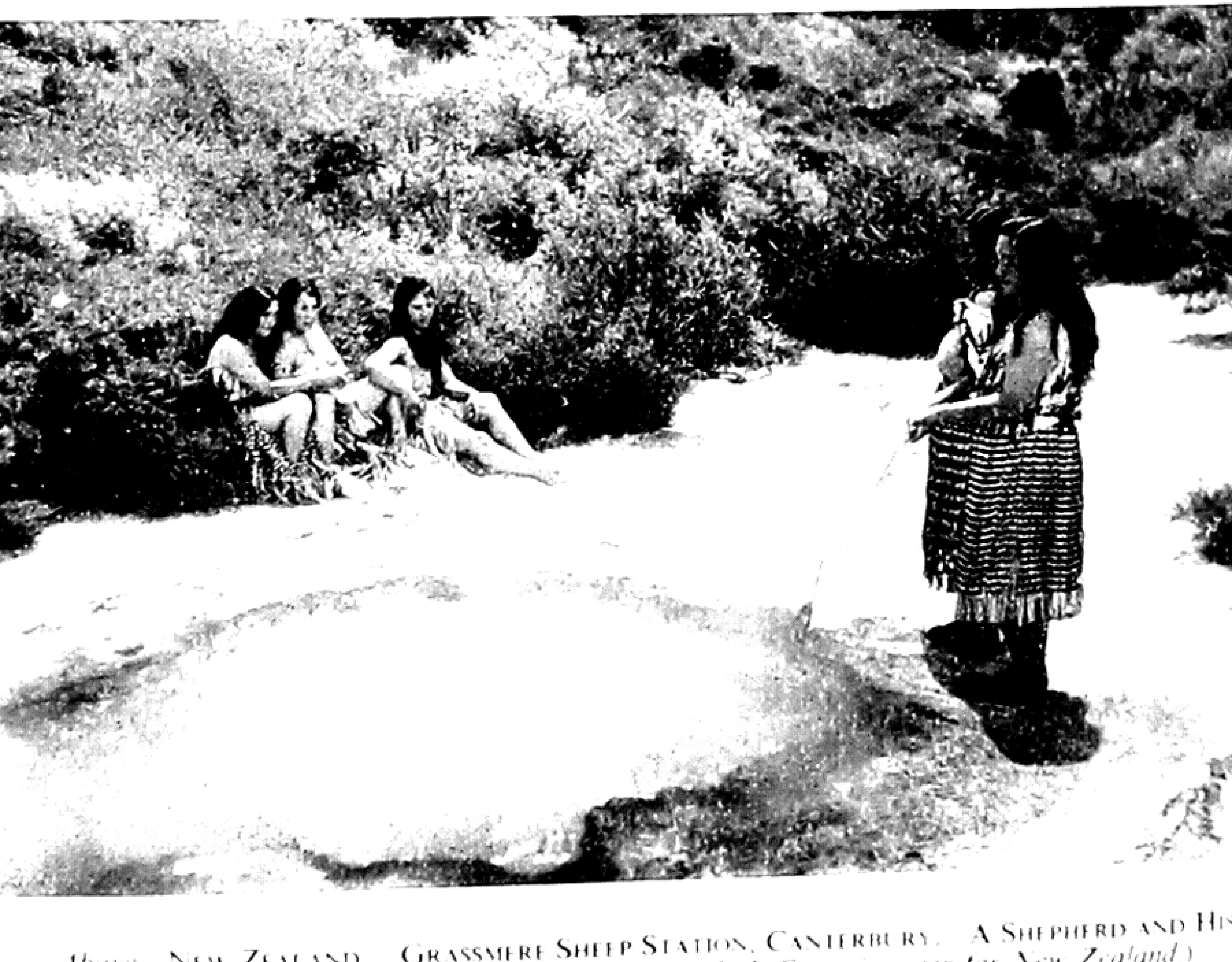
In the cooler South Island, where the western slopes of the Southern Alps are forested to the snow line, beech predominates, with conifers on the higher slopes. In the drier eastern parts of the Island there are scrub forests of manuka (the "tea-tree"), and vast areas were originally covered with tussock grass which is still used as rough grazing for sheep in some places.

All the forests of New Zealand are cared for by the State Forest Service which has replanted large areas with Scotch pines.

New Zealand is not rich in wild life. Seals are found along parts of the coast but there are no large native mammals

*Above.* Tasmania. The Huon Valley in Blossom Time. (*Agent-General for Tasmania.*)
*Below.* Northern Territory. Darwin, the First Australian Town to be Reached by Planes from Europe. (*Australia House.*)





*Above.* New Zealand. Grassmere Sheep Station, Canterbury. A Shepherd and His Dogs at Work in the Lambing Season. *(High Commissioner for New Zealand.)*

*Below.* New Zealand. Maori Women Cooking Food in a Hot Pool at Rotorua, North Island. *(High Commissioner for New Zealand.)*

inland, though lizards abound. There are, however, many birds; the penguin and the wingless kiwi are probably the best known. The kiwi is the national emblem of New Zealand but few remain for the Maoris hunted it for food and for its feathers. However, for many years it has been protected by law and it is now probably on the increase. Fifty years ago another flightless bird, the Takahe, was also fairly common in the bush. But it was also hunted for food and, losing its natural protection when the bush was cleared, it suffered through the introduction of new enemies—dogs, cats, and rats. For nearly fifty years it has been considered extinct but the Takahe was recently rediscovered in the forests of Southland, a fact which emphasises the remoteness of this mountainous district. The early settlers, in their anxiety to make New Zealand a "home from home", introduced other animals that have become pests. Rabbits compete with sheep for pasture; stoats and weasels originally brought in to keep down the rabbits now prey on useful wild birds. The opossum, from Australia, causes damage to orchards and destroys forest trees.

New Zealand's rugged coastline with its beautiful bays and inlets, the towering snow-clad mountains, the lakes, the forests, and the rolling plains—all these are a great asset to the people, who enjoy them to the full. Although few people live along the western coastlands or in the mountains, many go there for holidays both in winter and summer, and they attract many tourists from abroad. Some follow the Milford Track across the Southern Alps to Milford Sound in the fiord country of the south-west; others visit Queenstown on Lake Wakatipu, noted as a centre for the southern lakes and as a ski-ing centre in winter; many are attracted by the thermal region around Lake Taupo in North Island. For odd days and week-ends there are bays and inlets near all the larger towns where swimming and yachting are popular sports. Everywhere in New Zealand people spend much of the leisure out-of-doors, a fact which has been recognised by the Government which has established nine large national parks and many recreational reserves to which the public have right of access.

## Discovery and Settlement

The first European to sight New Zealand was the Dutch sailor, Abel Tasman, who came upon the coast of North Island as early as 1643. He anchored and tried to land, but one of his boats was attacked by Maoris and three of his men were killed. He made further attempts but each time the Maoris threatened again, so he was forced to sail away.

New Zealand was visited again in 1769, this time by Captain James Cook, a Yorkshireman. In the course of several voyages he sailed round both North and South Island and mapped much of the coastline. He landed in a bay close to where the town of Gisborne now stands and made friends with the Maoris.

After Cook, New Zealand was often visited by missionaries, traders, and whalers, but it was not until 1840 that any organised settlement began. In that year New Zealand became a British Colony and forty-six Maori chiefs signed the Treaty of Waitangi, acknowledging British authority, and becoming British citizens. In return they were guaranteed possession of their lands.

In the years that followed there were, unfortunately, further serious clashes over lands between British settlers and the Maoris but by 1850 settlements had been firmly established in the "four main centres" as they came to be called—Wellington, Auckland, Dunedin, and Christchurch, in that order.

In 1856 New Zealand became self-governing and six provinces with provincial councils were in being, with a General Assembly for the whole country. In 1876 this system came to an end and a single Parliament was set up to govern the whole country. In 1907 New Zealand achieved Dominion status.

## The People of New Zealand

Who were the Maoris, the people in possession of New Zealand when the white man arrived from Europe? There is no doubt that the original Maoris came from the Pacific Islands in native canoes. The main voyages were made during the fourteenth century, though there were certainly still earlier ones. The immigrants settled in New Zealand and gained a living by hunting, fishing, and growing crops, especially sweet potatoes.

The Maoris are fine-looking people with dark, olive skins and black, wavy hair. When the British first came the men had startling tatooed faces. They were organised in tribes, each centred on a village, and the chief of each tribe had a beautifully carved wooden house. Each village also had a highly decorated tribal meeting house where important decisions were made and where mourning ceremonies were held when a member died.

When the British first settled in New Zealand, the Maoris were rapidly reduced in numbers by disease, by war, and by alcohol sold to them by traders. In 1896 there were only 42,000 left. Since then the numbers have steadily increased and there has been a good deal of intermarriage. Today there are over 155,000 Maoris, though not all of these are full-blooded, and the rate of increase is twice that of the Europeans. They live mainly in North Island, the majority in the Auckland province; in South Island there are fewer than five thousand.

Some Maoris still live in villages little different from those of last century. Others have become farmers in the Western sense or have gone to live in towns, as industrial workers. Everywhere the Maoris are free and equal, sharing the responsibilities, duties, and rights of New Zealand citizenship, and electing their own representatives to Parliament. There are Maori doctors, lawyers, teachers, and civil servants, working among the white communities as well as in their own.

White immigration into New Zealand started slowly. In 1856 the population of the country was less than 60,000. Then, in the early '60's gold was discovered in South Island, in Otago, and near the west coast. It brought the usual stampede of fortune-seekers, many of whom turned later to farming. In North Island clashes with the Maoris held up immigration and development until later. Today, although New Zealand is larger than Britain, the population is only 2,560,000—about one for every twenty-five living in Britain. Two-thirds of the people live in North Island and nine out of ten New Zealanders are of British stock.

Although New Zealand's wealth lies mainly in her pastoral products, nearly two-thirds of her people live in towns. But the differences in outlook between town dwellers and country dwellers is not so marked as in industrial countries; the towns and cities are not large and the people spend much of their time in the country. Auckland is the largest city with an urban area population of 500,000, followed by Christchurch (238,000), Wellington (159,000), and Dunedin (109,000).

# CHAPTER XX

## NEW ZEALAND: DEVELOPMENT AND TRADE

New Zealand is a self-governing member of the British Commonwealth. The Queen is represented by the Governor-General. The Parliament consists of a Legislative Assembly and a House of Representatives, both of which meet at Wellington, the capital.

The State has taken a very considerable part in the economic development of New Zealand. It runs 3,500 miles of railways, controls the airlines, mines coal, operates saw-mills, and generates electricity, mainly from water-power. In North Island, the largest hydro-electric plants are on the Waikato River and in the high land above Hawke Bay; in South Island, at Lake Coleridge in the Southern Alps west of Canterbury, on the Waitaki River, and on the River Clutha at Roxburgh.

Railways have proved very costly to build, with many tunnels and bridges. They are of narrow gauge and tend to follow the line of the coast with branch lines running inland. Near the larger towns sections have been electrified. Internal air services are of very great importance in New Zealand since they provide much speedier passenger transport (see Fig. 78). Under the New Zealand National Airways Corporation they are expanding rapidly.

The Government is also greatly concerned to promote the welfare of farming on which the country largely depends. It encourages land settlement, market farm produce, guarantees stable prices for such produce, establishes irrigation schemes, and provides for research and the spread of practical scientific advice among farmers.

The high quality of New Zealand's farm produce is well known all over the world with the result that she has been able to build up a large export trade in butter, cheese, mutton and lamb, and wool—all pastoral products.

Farming first started in South Island where there was little trouble with the Maoris. Merino sheep, famed for their fine wool, were brought from Europe and did well on the rough

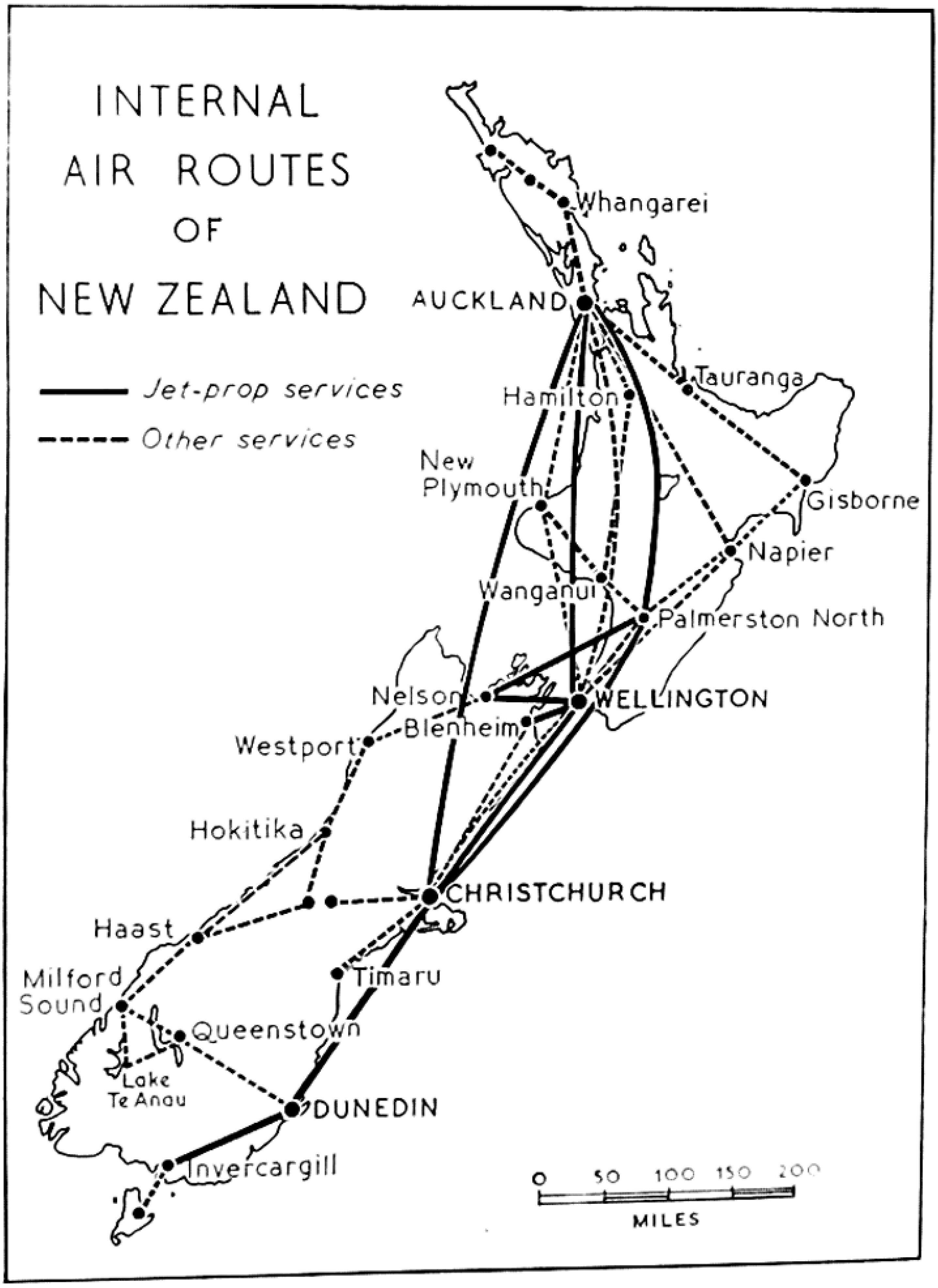


Fig. 78. New Zealand Airways.

tussock grass which covered wide areas on the Canterbury plains and on the lower slopes of the Southern Alps. Most of the farmers worked on a big scale, keeping their sheep in unfenced runs extending over thousands of acres.

In areas covered by "bush", the farmers worked relatively small holdings, felling the trees by axe, burning the undergrowth, and sowing special grass seed in the ashes. In this way they created good, rich pasture-land for their sheep.

In 1882 a drastic change took place when it became possible to send meat long distances in refrigerator ships. Freezing works were built and there was an increasing demand for mutton and lamb. The merino sheep were cross-bred with Romney Marsh sheep brought from England, and from these came the Corriedale, the distinctive New Zealand type which gives good meat and good wool. The flocks of sheep expanded and New Zealand farmers experienced a prosperous period. Unfortunately, the increasing demand led to overstocking, and many of the pastures were so heavily grazed that the remaining grass could no longer hold the soil which was washed away by heavy rain, or blown away by strong winds. Today great care is taken to control grazing. Aircraft are widely used on New Zealand farms for seeding ploughland, dusting and spraying crops against pests and—most important of all—to spread fertilisers on the slopes of hill land where it is difficult and costly to do it in other ways. Nearly half a million tons of phosphates are spread from the air every year and the richer growth of grass and clover which results not only reduces the danger of soil erosion but increases the numbers of sheep which can graze these lands.

There are some 32,000 sheep farmers in New Zealand and over fifty million sheep. The average flock has over 1,500 sheep. The early settlers kept sheep on the rough tussock grass of the Canterbury Plains of South Island and the meat became known as "Canterbury lamb". Today, the name is given to exports from all over New Zealand. Indeed, more than half the sheep are found today in North Island, and much of what is called "Canterbury lamb" comes from the dairying districts, especially from the Manawatu plains in the south-west and from the Hawke Bay area where the characteristic sheep are Romney-Southdowns (Romney ewes from the hill country crossed with Southdown rams).

If so much lamb is exported, why not beef? Many of the pastures are quite suitable for fattening cattle. Unfortunately, however, beef suffers as a food by freezing. It was not until 1933, when it was found possible to "chill" beef for export that the numbers of beef cattle increased. But refrigeration had a significant effect on the numbers of dairy cattle for it made the export of butter possible.

The best dairy lands are in the wetter parts of North Island where the land has been cleared of bush and drained—on the fertile plain of Taranaki, for example. In South Island, milk is produced on the west coast, and in parts of Otago. The dairy farms, especially in North Island, are small—usually under 100 acres—and are owned and worked by the farmer and his family; indeed, the "cow cocky", as the dairy farmer is often called, works seven days a week willy-nilly. But the dairy farmer of North Island has one great advantage over the British dairy farmer; the climate is so mild that the cows can graze outdoors all the year round. There is no need for him to stock up with large quantities of fodder crops—hay, oats, and roots—against a cold winter. In South Island, of course, it *is* necessary to grow more fodder crops.

Three-quarters of the dairy cattle are Jerseys, giving rich milk which is sent to small factories scattered all over the country. These factories, which make butter, cheese, and dried and condensed milk, are very efficient. They are co-operatively owned by the farmers themselves and great care is taken to ensure cleanliness and to turn out a very high-quality product for export. Nearly half the butter and cheese consumed in Britain comes from New Zealand.

Surprisingly, the number of pigs in New Zealand is rather small, though some chilled and frozen pork is sent to Britain.

### Arable Farming

New Zealand's chief grain crop is wheat, now almost confined to the plains of Canterbury and North Otago, where yields are high. Oats are grown in the same areas, mainly for feeding horses, and other fodder crops are also important. Considerable areas are devoted to the growing of grass seed for re-sowing pastures as they deteriorate. In fact, the New Zealand farmer mixes the grass seed for his pastures, to suit the soil and the climate, as carefully as an expert chef mixes the ingredients for a cake.

In many places, especially in South Island, the soil is fine—loess that has been blown down from the mountains. Elsewhere it is gravelly, or stony, so that some farmers have to keep men constantly employed removing the stones in order to make cultivation possible at all. In mid-summer (Christmas time here in Britain), the soil often dries out very quickly and in some parts of the Canterbury plains there are irrigation schemes which make it possible for farmers to flood their fields two or three times during the season.

Other crops include maize from the Auckland, Gisborne, and Hawke Bay areas of North Island, early potatoes from the Auckland peninsula, late potatoes from the Canterbury district, and hops around Nelson.

Fruit is grown in favoured districts where the soil and sun help the crop. The Auckland Peninsula produces citrus fruits, mainly oranges and lemons. Grapes also grow well there, and around Hawke Bay. Near Nelson there are orchards of apple and pear trees and Central Otago produces not only apples and pears, but also apricots and peaches.

In the fruit-growing areas, and elsewhere where they can collect plenty of honey, bees are kept on a large scale. Honey is exported in considerable quantities.

## Mining

Today, coal is by far the most important mineral product of New Zealand. It is found in many places but is often of poor quality and is only used locally. The best quality coal is found near Westport on the west coast of South Island. The mines are on the hillsides and the coal is brought down to the coast on a very steep railway. In North Island coal is found in the Waikato area and brown coal, or lignite, is mined at Huntley.

Gold was first found in 1861 at Gabriel's Gully in Otago where the river gravels were worked by pan and shovel methods by the early prospectors. Today these gravels, and others on the west coast of South Island, near Hokitika, are dredged for gold.

In North Island, gold was found a few years later at Thames, and at Coromandel, but it occurred in quartz rock and had to be quarried out. Modern crushing machinery is now used to extract the gold in this area.

Other minerals include silver, iron, manganese, mercury, asbestos, and sulphur. Kauri gum is also classed as a mineral since it consists of fossil resin from kauri pines long since buried in the ground. This clear brown "gum", used in making varnish, is dug up in the Auckland Peninsula.

### Fishing

Enough fish are caught round the coasts of New Zealand to provide for the needs of the chief towns, with a small surplus for export to Australia, but they are of kinds little known in Britain, *e.g.* schnapper, tarakihi, and blue cod. Oysters are dredged from beds in the Foveaux Strait between South Island and Stewart Island, and also along the rocky coast of the Auckland Peninsula.

River fishing is a favourite sport, and salmon and trout were early introduced by the first settlers. Brown trout from Tasmania and Californian rainbow trout flourish in the rivers. There is "Big game fishing" for swordfish and sharks during the summer months off the north coast of North Island.

### Industry

Most industries in New Zealand sprang up in response to local needs. The early sailing ships needed ropes which were made from New Zealand flax. Ropes are still made today, and flax is also woven into canvas for bailing wool for export.

Tanneries deal with hides from the cattle, and there are boot and shoe factories at Christchurch and elsewhere. Woollen cloth is made for home consumption and for export, and other farm products, especially dairy products, are processed and packed to go overseas.

A nylon factory has been established near Auckland and a combined pulp, newsprint, and timber mill at Kawerau, a few miles from the Bay of Plenty in the north of North Island. The raw material comes from the largest of the New Zealand State Forests which lies to the north-east of Lake Taupo. This forest consists mainly of Monterey pine trees with some Corsican pine and Douglas fir, all of which grow rapidly;

trees planted in the nineteen-twenties have already matured. The logs from the forest are sent to the Kawerau mill by railway. A deep-water port has been constructed at Mount Maunganui for the export of pulp and timber, mainly to Australia and Japan.

At Wairekei, near Lake Taupo in North Island, the natural steam resulting from thermal activity (see p. 309) is used to generate electricity, though 95 per cent. of New Zealand's electric power is generated from water power.

Natural gas occurs in Taranaki and this may well, in future, be piped to urban centres for domestic and industrial use.

There is little heavy industry in New Zealand but a steel plant is being built south of Auckland, near the mouth of the Waikato River to use local coal and low-grade iron from sands which occur along the west coast of North Island.

## Chief Towns

There are four "main centres" in New Zealand which decrease in population, in turn, from north to south.

*Auckland* (500,000) is the largest city. It serves an important dairying district and has good, deep-water anchorage in two harbours which are separated by a narrow isthmus. It is a natural port of call for shipping, is well served by railways running north and south, and has an international airport. Auckland has the most concentrated industrial area in New Zealand.

*Wellington* (159,000), with its central position on the harbour of Port Nicholson, is the political capital with the Parliament buildings. It is surrounded by hills with residential areas, and leading down to the harbour in a wide valley, is *Hutt City* (103,000), a modern factory centre.

*Christchurch* (238,000) is a well-planned cathedral city, the most English city in New Zealand. It is a great collecting centre for the lamb, wool, and wheat, of the Canterbury plains. On the coast is Port Lyttelton where the produce is loaded on to ships for export.

*Dunedin* (109,000) grew from an early settlement of 1848 which was no more than a group of wooden houses made from local timber. Most of the settlers were from Scotland and it soon came to be known as Dunedin—the old Gaelic name for Edinburgh. When gold was discovered inland' in 1861, Dunedin grew rapidly and became the largest city in the country. Today it is the fourth largest city with grey stone buildings and many small industries. Blankets, rugs, and woollen cloth are made. There are factories for making agricultural machinery, tanneries, and food factories which produce jam, cheese, condensed milk, chocolate, and biscuits. Eight miles away lies *Port Chalmers*, Otago's chief port, which exports wool, meat, cereals, fruit, and dairy produce.

Other important towns include *Invercargill* (45,000) in Southland where it is proposed to build an aluminium smelter, using local hydro-electric power and bauxite from Weipa in Queensland, Australia. *Wanganui* (38,000) on the river of the same name; *Nelson* (27,500), a fine cathedral city in the north of South Island; *Hamilton* (58,000), the centre of the great dairying district of Waikato; *Westport* and *Greymouth*—on the main coalfields; *Gisborne* (26,600), a river port; and the towns of *Napier* (36,000) and *Hastings* (36,000) on Hawke Bay.

Many New Zealand ports are linked by coastal shipping. Small vessels carry cargoes from port to port and there are regular passenger services. Those between Wellington and Lyttelton, and across Cook Strait, operate daily.

**Trade**

Almost all the exports of New Zealand are of food (*e.g.* butter, cheese, meat) or of raw materials (*e.g.* wool), mainly for Britain. Imports are mainly of manufactured goods (*e.g.* machinery, motor cars) from the British Commonwealth and the U.S.A., with Britain the biggest individual supplier.

The value of the chief exports and imports in 1963-4 is shown below:—

| EXPORTS | £ N. Z. |
|---|---|
| Wool | 135,572,000 |
| Meat | 91,247,000 |
| Dairy produce | 78,407,000 |
| Hides and skins | 15,182,000 |

| IMPORTS | £ |
|---|---|
| Machinery and vehicles | 105,627,000 |
| Metals and metal goods | 31,173,000 |
| Food, drink, and tobacco | 23,176,000 |
| Petrol and oils | 22,882,000 |
| Chemicals and fertilisers | 11,073,000 |

# CHAPTER XXI

## ANTARCTICA

### Surface Features and Climate

Antarctica is a vast mountainous continent surrounding the South Pole. It is larger than Europe and extends in places beyond the Antarctic Circle, or north of latitude 66½° S. It is mainly plateau, covered with a blanket of ice varying from a few hundred to several thousand feet in thickness, except where snowy, mountain ranges rise above the surface to a height of up to 17,000 ft. Antarctica has been described as like a large, round, iced cake, with two roughly triangular pieces cut from it—the Weddell Sea and the Ross Sea. The mountains are largely of volcanic rocks and Mount Erebus on Ross Island still shows signs of activity. One range extends towards South America forming the peninsula of Graham Land; it is, in fact, a continuation of the Andes.

The surface of the land is nearly always frozen, and the air is dry. Even in summer, temperatures seldom rise above freezing point, and in winter they often drop to over 40° below zero Centigrade (over 70° below zero Farenheit). Snow may fall for days on end and sometimes, when a strong wind rises, the snowstorm becomes a howling blizzard. In the short summer, when the air temperature rises, there is often dense fog.

### Wild Life

A number of birds and animals are found round the coasts of this remote and barren land; inland animal life, except for mosquitoes, does not exist. The penguins, which live in "rookeries" in the coastal areas, are the best-known birds. They are small, thick-set, and flightless, with flippers instead of fully developed wings, and they excel in swimming. They live on fish and small shrimp-like creatures which abound in Antarctic seas. Although they can travel for considerable distances over ice and snow, the need for food makes them live close to the cold waters of the Southern Sea; few penguins flourish in the warmer waters to the north. Petrels and gulls are also fairly common in Antarctica.

Several kinds of seal inhabit the Antarctic beaches in summer. In winter they live below the ice, making breathing holes with their teeth. Whales also abound. In fact, it was the hunting of seal and whales which first led to the discovery of the continent, and many of the names of the early whaling pioneers are found on our maps—Enderby, Weddell, and Biscoe, for example.

### Exploration

Since the days of the early whalers there have been many carefully planned expeditions to Antarctica linked with such names as Shackleton, Scott, Amundsen, Byrd, and Ellsworth. Before the days of the aeroplane and the caterpillar tractor or "snocat" all Antarctic exploration was done with dog sledges and these are still used for travelling over the ice and snow. The usual team of nine dogs will haul a load of 1,000 to 1,500 pounds.

In 1929 Admiral Byrd, the American explorer, established a community in Antarctica called "Little America" and lived for a considerable period in this frozen waste. Since then other permanent bases have been established for systematic exploration. These have been organised by the British Antarctic Survey with bases on Coronation Island in the South Orkneys, and in South Graham Land. At the bases wooden huts are built and securely held down by steel hawsers cemented to the rock foundation. Each year a ship is sent to take mail and stores and to relieve personnel.

In 1958 the Americans established a base at the South Pole which was supplied by air. In the same year the Antarctic continent was crossed by a British party led by Sir Vivian Fuchs (see Fig. 79). A New Zealand party, led by Sir Edmund Hilary, also reached the Pole from Scott Base.

The food used by the men who explore Antarctica is carefully planned to meet their needs and to be readily carried. It consists mainly of pemmican (a name now used for an extract of beef with high fat content), butter or margarine, biscuits, sugar, pea flour and oatmeal, cocoa, chocolate, and vitamin extracts.

## Political

Most of the early explorers claimed parts of Antarctica for their home country, and the continent is now divided politically into sectors. The *British Sector*, known as the British Antarctic Territory, is a colony which lies between latitude 20° W. and 80° W. and includes all the British land south of latitude 60° S.—the South Orkneys, the South Shetlands, Graham Land, and the land bordering the Weddell Sea. East of the British Sector (travelling clockwise on the map) lies the *Norwegian Sector*, or Queen Maud Land, extending to nearly 50° E. Then comes the *Australian* Antarctic Territory, stretching to 160° E. but broken by the narrow *French Sector* of Adélie Land. Beyond 160° E. comes

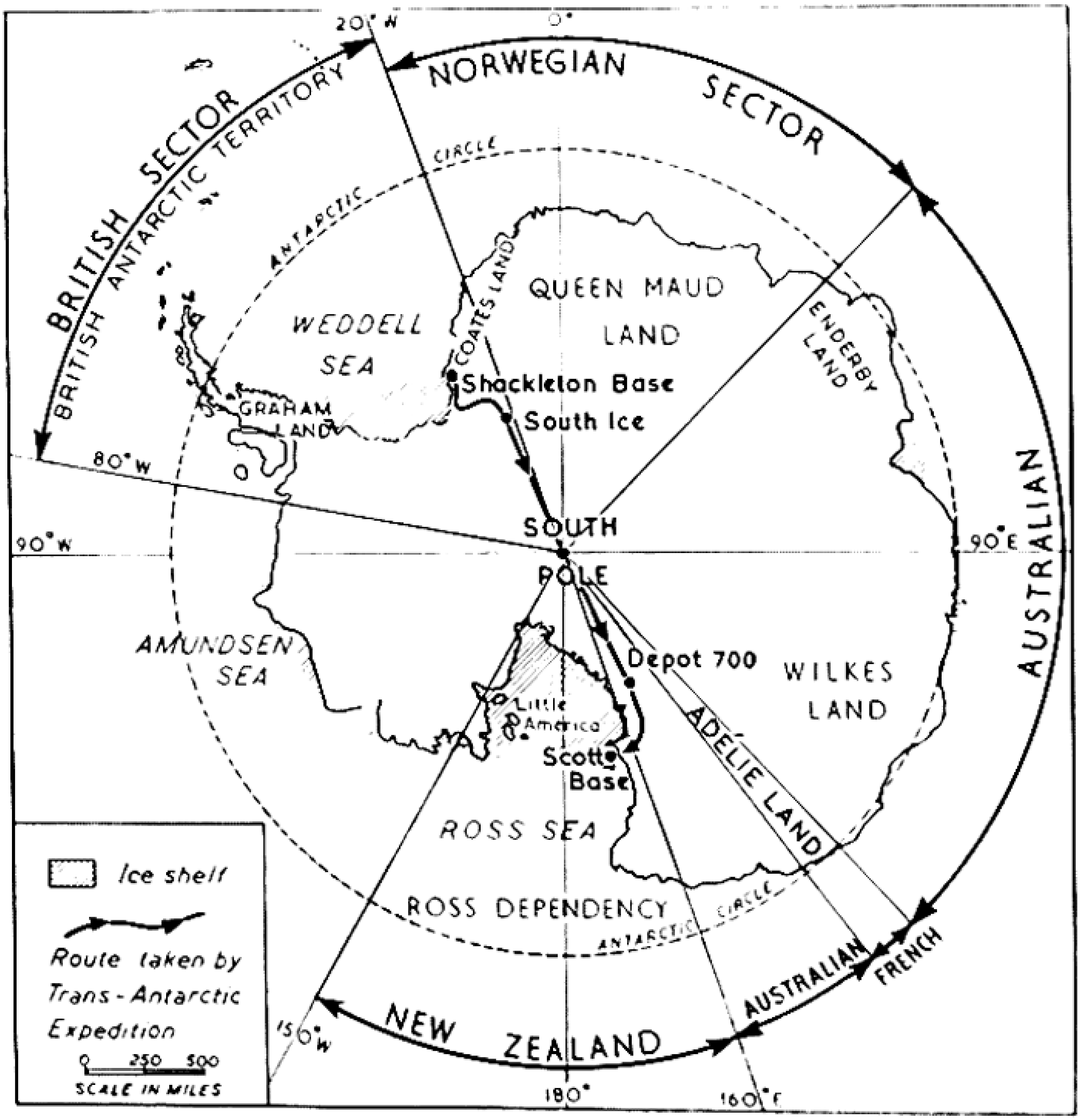


Fig. 79. ANTARCTICA.

*New Zealand's* Ross Dependency which includes the coastal areas around the Ross Sea. The remaining sector, bordering the Amundsen Sea, is not claimed, though the United States "reserves rights" in the region.

The British territory in Antarctica is not recognised by Argentina and Chile. Chile claims all lands and islands between 53° W. and 90° W. as the Chilean Antarctic, a sector which would include the whole of Graham Land. Argentina and Chile dislike the idea of British territory so near their coasts and, from time to time, have laid claim to the Falklands, and to parts of the British Antarctic Territory.

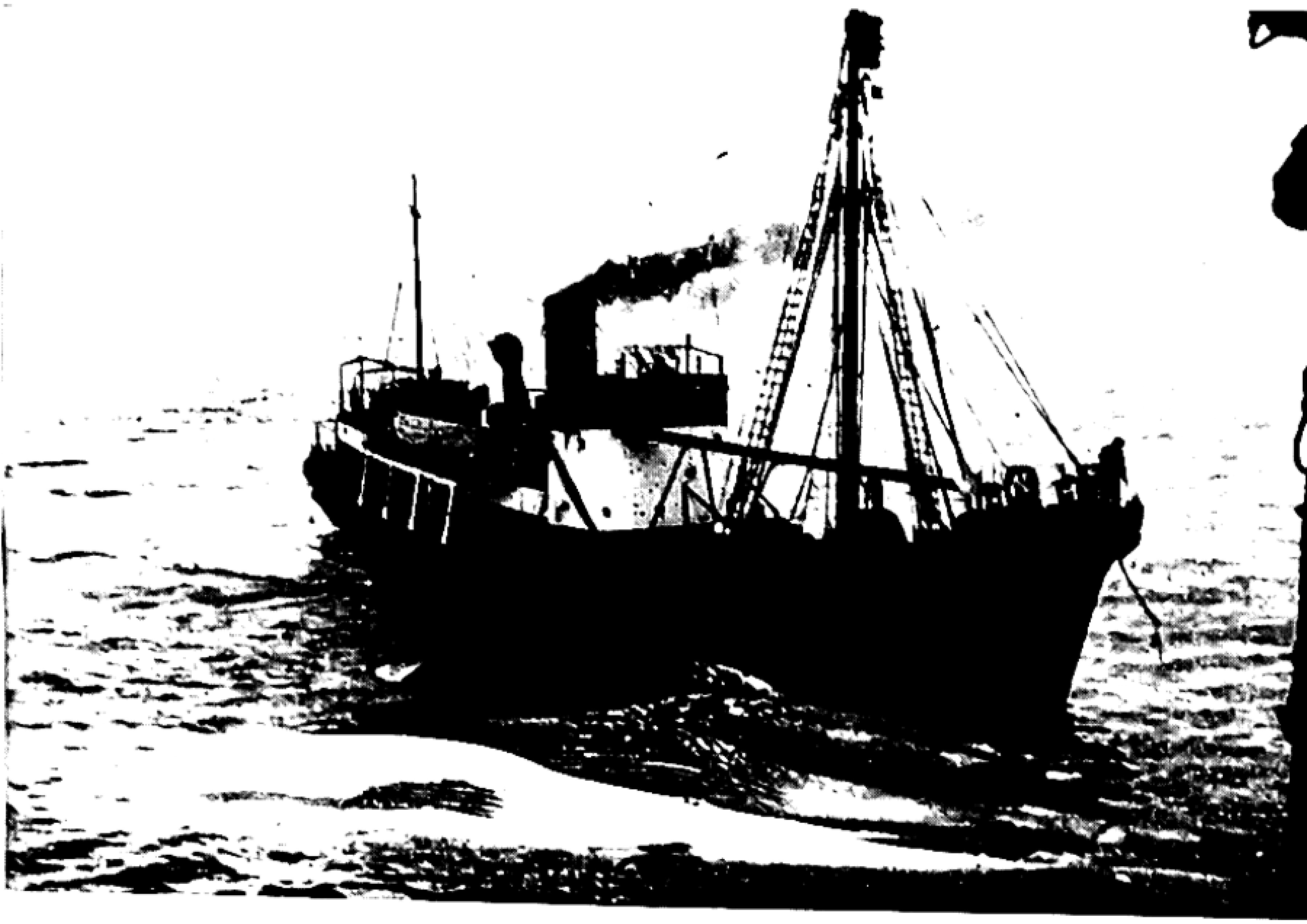
The Falkland Islands have been British since 1833. They include the dependencies of South Georgia and the South Sandwich Islands. There is a Governor with an official administration at the capital, Port Stanley. The islands have a population of 2,150, many of Scottish extraction. In addition there are 440 people in South Georgia which serves as a whaling station; only ten of these are women. The main occupation of the Falkland Islands is sheep rearing and exports of wool total over £1 million a year.

**Whaling**

The Antarctic mainland is of little or no economic importance. Copper and coal have been found but it would not pay to try to work these deposits. The main wealth of the region comes from whales—mammals adapted to live in the sea, though they do not as a rule remain below the surface for more than fifteen minutes at a time.

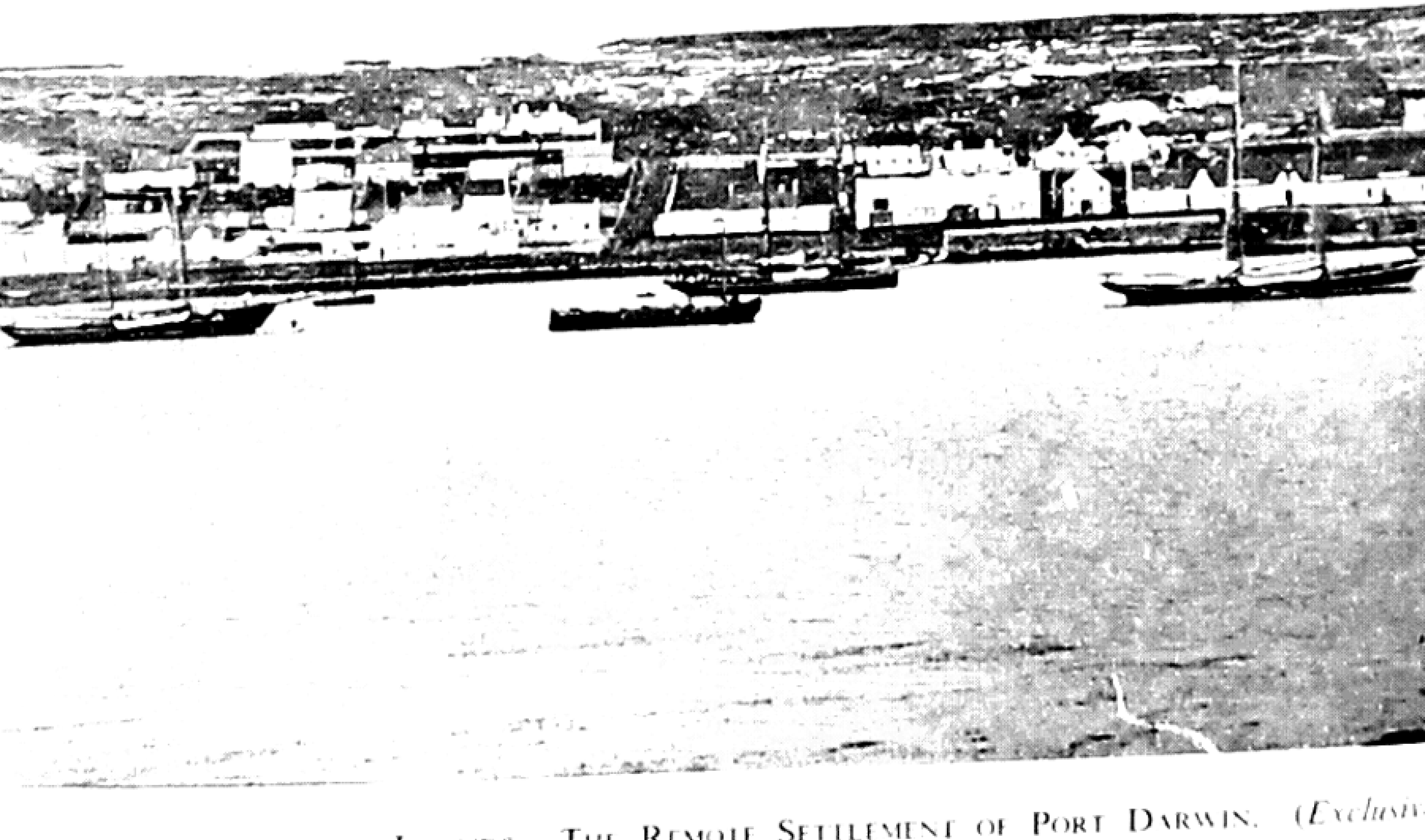
Whaling vessels have for centuries ranged far afield; they cruised around New Zealand before there were any permanent white settlements on the islands. These were sailing ships equipped with long, slim, whale boats which were used for pursuit as soon as the spout of a whale was seen. The whales were harpooned and then followed a long hunt until the creatures were exhausted and could be killed. Finally, the whaler would tow the carcase to a shore station where the blubber was stripped off, boiled down, and shipped to Europe.

Today, whale oil is used in the manufacture of margarine and whale meat is also used. The whaling fleets usually start out from Western Europe in the early autumn and finish the



*Above:* ANTARCTICA. ADELIE PENGUINS AT LAGOTELLERIE ISLAND. (*Falkland Islands Dependencies Survey.*)

*Below:* ANTARCTICA. A DUTCH WHALE-CATCHING SHIP APPROACHING THE FACTORY SHIP. (*Shell Photographic Unit.*)



*Above:* Falkland Islands. The Remote Settlement of Port Darwin. (*Exclusiv*
*News Agency.*)

*Below:* Falkland Islands. The Capital, Port Stanley. (*Exclusive News Agency.*

season early in the April of the following year, thus avoiding the Antarctic winter. The modern method is to hunt in small vessels known as whale catchers or chasers, sometimes assisted by aeroplanes or helicopters. Each ship has a gun mounted in the bows from which the harpoons are fired. The head of each harpoon is fitted with an explosive charge which normally kills the whale quickly, though it is, without doubt, a painful death. It is possible that a harpoon trailing an electrified cable may be used in future—a method which should prove painless. Large-scale experiments are already being carried out to see if this is likely to be commercially successful.

The whaler proper is a factory ship and when the chaser vessel tows the carcase alongside, it can be dealt with at once. The oil is stowed in barrels while the ship is still at sea; the meat is tinned or kept in refrigerators. Each factory ship is equipped to deal with as many as thirty whales a day and keeps in touch with its fleet of chasers by radio and radar.

Norway, Britain, Japan, Russia, and Holland normally send factory ships to the Antarctic—all with attendant chasers. In all, some twenty ships take part. Many members of the crews manning the British ships are Norwegians with long experience of life in southern waters.

The British island of South Georgia serves as a base for the whaling fleets.

### Antarctic Research

Much still remains to be discovered about the Antarctic. A dozen nations are helping to increase the sum total of knowledge about this vast continent—its geology, climate, and wild life, notably Britain, the U.S.A., and the U.S.S.R. Britain's research team, known as the British Antarctic Survey, consists of nearly one hundred hand-picked young men who endure the long Antarctic winters in bases on the Graham Land peninsula and on nearby islands.

Under the Antarctic Treaty of 1959, Antarctica can only be used for peaceful purposes and there can be no territorial changes for thirty years.

# QUESTIONS

## AFRICA

1. Give some reasons why the interior of Africa was comparatively unknown until the nineteenth century.

2. Give the name and location of one of each of the following in Africa:—

(*a*) a Rift Valley lake; (*b*) an inland drainage basin; (*c*) an inhabited plateau; (*d*) a volcanic mountain; (*e*) a large waterfall.

3. Describe the appearance and mode of life of the following African peoples and name the regions where they live today:—

(*a*) Bushmen; (*b*) Hottentots; (*c*) Pigmies; (*d*) Berbers.

4. What part did each of the following play in the discovery of Africa?

(*a*) Vasco da Gama; (*b*) Livingstone; (*c*) Mungo Park.

5. (*a*) Describe the climate and scenery of the Sahara Desert as fully as possible.

(*b*) How may an oasis be formed? What part do oases play in the lives of desert people?

6. Grapes, esparto grass, dates, cork, wool, and hair are all produced in the Barbary States. In each case, name a region from which the product is obtained and give reasons for your choice.

7. Describe a journey down the Nile from Lake Victoria to the Mediterranean Sea, noting the climate and vegetation belts through which you would pass and any interesting natural features you might see. Illustrate your answer with a sketch map.

8. Account for the Nile floods and describe how the water of the Nile is used for irrigation. Name the chief summer and winter crops produced.

9. Eritrea and Ethiopia are united as one country. Contrast the physical characteristics of each and discuss any advantages which may result from the union.

10. State the position and give a geographical account of each of the following:—

(*a*) the Sudd; (*b*) the Tell; (*c*) the Gezira Plains.

11. Palm oil, cocoa, groundnuts are all important products of West Africa. Name the chief producing areas of each product and give reasons for your choice.

12. Give an account of the savanna lands of West Africa, using the headings—(*a*) climate; (*b*) vegetation; (*c*) animal life; (*d*) human activities.

13. Locusts, tsetse flies, cotton worm, and swollen shoot each endanger crops or animals in Africa. In each case (*a*) describe the pest and say where it is most prevalent; (*b*) give an account of the damage it does and indicate measures taken to combat it.

14. Give the exact position of the following towns and illustrate your answer with sketch maps; in each case account for its importance—Alexandria, Port Said, Kano, Dakar, Takoradi, Algiers.

15. Describe a journey down the Congo from the Katanga region to its mouth, noting the chief obstructions to traffic.

16. Describe the various routes by which minerals from the Katanga region of the Congolese Republic may reach the sea. Discuss the advantages and disadvantages of each route, illustrating your answer by a sketch map.

17. Cotton, coffee, and sisal hemp are important products of East Africa. In each case state the position of the chief producing areas and describe the conditions under which the product is grown.

18. Name the two largest Portuguese countries in Africa. Describe the economic importance of one of these countries.

19. Give an account of Zambia and Rhodesia under the headings—(*a*) position, relief, and drainage; (*b*) peoples and government; (*c*) economic development.

20. Describe the native population of South-West Africa and give some reasons why a union with the Republic of South Africa is opposed by most of the native Africans.

21. Describe the position of Johannesburg and give reasons for its importance. Illustrate by a sketch map.

22. Name the chief agricultural products of South Africa and indicate the chief producing areas on a sketch map. Discuss some of the difficulties which have hindered the development of farming in South Africa.

23. Contrast the positions and activities of Cape Town, Durban, and Beira, giving reasons where possible.

24. Describe the distribution of the main African railways. Discuss the main purposes for which these railways have been constructed, illustrating your answer with four actual examples. Discuss also the main difficulties to be overcome in the development of African railways.

25. For the most part Africa produces raw materials rather than manufactures.

(*a*) Name *five* important raw materials and indicate the major areas of production.

(*b*) Describe the position of three different areas in Africa where manufacturing industries are developing. In each case name the chief articles produced and give reasons why the chosen areas are suitable for their manufacture.

26. Africa is the chief world producer of gold and diamonds. Name the chief areas of production of each of these minerals.

27. Food production is being encouraged in many parts of the world. Suggest areas in Africa from which additional food supplies might be obtained and the methods most likely to be used in securing them.

28. Human porterage, camel, horse, oxen—all these are used as means of transport in Africa. In each case state where the method is commonly used and discuss why it is particularly suitable for the area you mention.

29. Contrast and describe the types of dwellings used by (*a*) Berbers; (*b*) natives of Zululand; (*c*) dwellers in oases. Give reasons for the differences you describe.

## SOUTH AMERICA

30. Coffee and cocoa are both cultivated in Brazil. Draw a sketch map to show the chief areas of production and the ports of export. In the case of one of these products describe its cultivation and preparation for market.

31. Give an account of the mineral production of Brazil.

32. By means of well-labelled sketch maps indicate the importance of Manaos; Rio de Janeiro; Porto Alegre; Sao Paulo.

33. Contrast Uruguay and Paraguay with regard to position, products, and development. Give reasons where possible.

34. Describe the scenery of the Pampas and give some account of the farming which is carried on there. Name the chief export products.

35. Give a reasoned geographical account of two of the following regions in Argentina:—

(*a*) Gran Chaco; (*b*) Arid West; (*c*) Patagonia.

36. Contrast the racial elements of the populations of Brazil and Argentina.

37. Describe the following products and the use man makes of each. Show the chief areas of production of each product on a sketch map:—

(*a*) yerba maté; (*b*) alfalfa; (*c*) quebracho; (*d*) parana pine.

38. Divide Chile into four natural regions and give reasons for your selection. Describe the chief products of each region, mentioning ports of export where possible. Illustrate by a sketch map.

39. On a map of South America mark and name the following areas:—

(*a*) a region of wet forest land with no cultivation;

(*b*) a region where forests have been cut down and the land is now under cultivation;

(*c*) a region of uncultivated desert;

(*d*) a desert region cultivated by irrigation.

In each case name the chief products obtained.

40. Give an account of the chief mineral wealth of the Andean countries of South America.

41. Cotton, wool, and rubber are all produced in Peru. Give the chief areas of production of each, and explain why one country can produce products which require such different geographical conditions.

42. Name three important highland towns in South America and in each case give an account of its position and importance.

43. South America is an important world-producer of petroleum. Name the chief sources of petroleum in South America and show their positions on a sketch map. In one case discuss the development of the industry.

44. Contrast the navigation of the Amazon and its tributaries with that of the Congo in Africa.

45. Bananas, linseed, sugar cane, and vines are products characteristic of different areas of South America. Choose three of these products and show by sketch maps the areas in which each is important. In each case describe the conditions which make cultivation successful.

46. Describe the following and say where each is found in South America. Explain how man makes use of each of the items given:—

(*a*) guano; (*b*) the llanos; (*c*) llama; (*d*) coca.

47. Give a geographical account of life on the Andean plateau of Peru or Bolivia.

48. On a map of South America mark one highly developed area and one poorly developed area. Give reasons for your choice.

49. Why are most South American towns on or near the coast? Give examples of five large coastal towns and two inland towns. In the case of each town give brief reasons for its importance.

## AUSTRALIA AND NEW ZEALAND

50. Give a short account of the discovery and early colonisation of Australia.

51. Describe what you might see if you visited the Great Barrier Reef. Discuss its mode of formation.

52. On a map of the world show the chief routes by sea and air from Great Britain to Australia and New Zealand. Show at least three possible calling places on each route.

53. By means of a sketch map show the chief sheep-rearing districts in Australia. Give reasons why you chose these regions. Give examples of important sheep-rearing areas in Africa and South America.

54. Certain Australian farms specialise in dairy farming and others in beef production. Give a reasoned account of the distribution of these industries and illustrate by a sketch map.

55. Write an essay on Australian animals and birds.

56. What conditions are favourable for the formation of an artesian well? Where do artesian basins occur in Australia and for what purpose are they used?

57. Describe life on an Australian sheep farm.

58. Give a geographical account of tropical Australia under the headings—(*a*) position; (*b*) climate; (*c*) chief productions and development.

59. Describe the Australian Aborigines and contrast them in appearance and mode of life with the Maoris of New Zealand.

60. (*a*) By means of a sketch map show the chief regions where coal, iron, and hydro-electricity are produced in Australia.

(*b*) Manufacturing industries are increasing in Australia. Name some of the industries and indicate the chief areas of production.

61. A population map of Australia shows that most people live on or near the east, south-east, and south-west coasts. Give reasons for this distribution.

62. Butter, meat, wheat, and temperate fruits are exported from Australia to Britain. Show the chief producing areas on an outline map of Australia and in each case name a port of export. Choose two of these commodities and explain the conditions which favour production.

63. Victoria has twice as many dairy cattle as beef cattle; West Australia only about a quarter as many dairy cattle as beef cattle. What reasons can you give for the difference between the two states in this respect?

64. Which parts of South America and Africa most nearly resemble Eastern Queensland? Give reasons for your answer.

65. Contrast the eastern and western sides of the South Island of New Zealand with respect to (*a*) relief and coast-line; (*b*) climate; (*c*) products.

66. By means of sketch maps indicate the factors which have been responsible for the importance of three of the following towns—(*a*) Sydney; (*b*) Wellington; (*c*) Adelaide; (*d*) Hobart; (*e*) Port Darwin.

67. Describe the importance of the Murray-Darling River system to Australia and contrast it with the importance of the Plate River system to Argentina.

68. Give a geographical account of Tasmania or the North Island of New Zealand, using the headings—(*a*) position; (*b*) relief and scenery; (*c*) climate; (*d*) products, development, and chief towns.

69. Efforts are being made to increase the world supply of food. Choose three areas in the Southern Continents which are being developed for this purpose. In each case name the main products and discuss the suitability of the area for food production.

70. Write an account of the mineral wealth (other than coal and iron) of Australia.

## ANTARCTICA

71. Describe a modern whaling expedition to Antarctic waters. Name a possible port from which the ships might sail and describe anything which might be seen on such an expedition.

# EXAMINATION QUESTIONS

The following questions have been reproduced by permission of the various Examining Bodies concerned from examination papers at the Ordinary Level of the General Certificate of Education. Questions marked with an asterisk are from *Alternative* papers. (*B.*) Bristol, (*C.*) Cambridge, (*D.*) Durham, (*L.*) London, (*N.*) Northern Universities, (*O.*) Oxford, (*O. and C.*) Oxford and Cambridge Joint Board, (*W.*) Welsh.

1. Select any three areas in Africa that are relatively well peopled and briefly explain why they are so. (*W.*)

2. Write an account of (*a*) mining in the Congolese Republic, (*b*) the goldfields of South Africa. (*O.*)

3. Write notes on the production of (*a*) wheat and maize in South Africa, (*b*) sisal hemp in East Africa, (*c*) groundnuts in West Africa. (*O.*)

4. In what ways does the import and export trade of Takoradi differ from that of Mombasa? Give reasons. (*O.*)

5. Comment briefly on any *two* of the following: Transport in West Africa; perennial irrigation in Egypt; the products of the Atlas region. (*B.*)

6. Give a geographical account of *either* Kenya *or* the Congolese Republic. (*B.*)

7. It is hoped that in the future Africa will produce greater supplies of both raw materials and foodstuffs.

Choose *one* typical African product of each of these classes and suggest (*a*) areas from which additional supplies may be obtained; (*b*) methods likely to be used in securing them. (*N.*)

8. Show to what extent the character of the relief, climate, and natural vegetation was responsible for the delay in the "opening up" of Central Africa by the white man, and describe the influence of any other deterring factors known to you. (*O. and C.*)

9. Describe the physical and other geographical conditions under which *three* of the following are produced in the areas named, emphasising the factors which favour or hinder large-scale production for export: coffee in Kenya, cocoa in Ghana, sisal hemp in Tanzania, palm oil in Nigeria, copper in Zambia. (*O. and C.*)

10. With the aid of appropriate sketch maps, describe the position and importance of *four* ports, choosing *two* from group (*a*) and *two* from group (*b*):—

(*a*) Beira, Lourenço Marques, Lobito Bay.

(*b*) Durban, Lagos, Takoradi. (*O. and C.*)

11. *Either* describe briefly any *two* of the following areas *or* give a full geographical account of any *one* of them: Ethiopia, Malagasy, Malawi, Uganda, Sierra Leone. (*O. and C.*)

*12. Show on a sketch map the climatic regions of South Africa. Describe and account for the climate in each region. (*O. and C.*)

*13. Discuss the geographical factors influencing the modes of life of the people of *either* Nigeria *or* Ghana, noting the effects of modern economic developments in the colony you have selected. (*O. and C.*)

*14. *Either* describe the distribution of people of European origin in South Africa and discuss the parts played by these people in the development of the country.

*Or* relate the railway system of South Africa to the relief, mineral resources, and ports of the country, illustrating your answer with a sketch map. (*O. and C.*)

*15. Discuss the effect of relief and climate on the present and potential agricultural development of Kenya and Tanzania. (*O. and C.*)

16. Each of the following commodities is an important product exported from the area named: tin from Nigeria, cotton from the Sudan, copper from Zambia, gold from the Transvaal.

Choose *three* of these commodities and, for each, draw a detailed sketch map to show the chief area of production, the name of the producing region or centre, the route by which the product is sent to the coast for export, and the usual port of export. (*O. and C.*)

17. Locate, preferably on a sketch map, (*a*) two widely separated areas in South America which have a very heavy rainfall, and (*b*) two widely separated areas where the rainfall is deficient. In the case of either (*a*) or (*b*) account for the rainfall conditions in the areas you mention. (*O. and C.*)

18. Study a map showing the chief railways of South America. Describe and give reasons for the uneven development of railways in the continent. (*C.*)

19. On a large outline map of South America, indicate areas where the following are produced (N.B.—for each commodity only *one* area should be shown): petroleum; coffee; sugar (by irrigation); grapes; beef; tin. Select any two of these products and describe the geographical conditions under which each is produced. (*W.*)

20. (*a*) Explain why the population of Brazil is largely concentrated in a relatively narrow belt of country bordering the Atlantic coast. (*b*) Locate *one* area within this belt where the population is unusually dense and account for the high density of population in this area. (*O. and C.*)

21. Write an account of the production of each of two of the following minerals in the areas named: (*a*) copper in Peru, (*b*) nitrates in Chile, (*c*) tin in Bolivia.

Arrange your answer under the headings—(i) location of the main producing area, (ii) physical and other factors affecting population, (iii) means of communication with ports of export, (iv) uses to which product is put. (*O. and C.*)

22. (*a*) Draw a sketch map to show the chief areas where (i) cattle, and (ii) sheep, are reared in Argentina.

(*b*) State the geographical conditions which help to account for the importance of cattle and sheep rearing in this country. (*O. and C.*)

23. Under the headings of (*a*) relief features, (*b*) occupations, write an account of either Colombia or Venezuela. (*O. and C.*)

24. South America is on the whole thinly populated and great areas inland are almost uninhabited. Locate *two* large areas which are thinly populated and in each case indicate some of the factors which have proved obstacles to settlement. (*B.*)

25. Bananas, wool, coffee, linseed, sugar-cane, and cacao are products characteristic of different areas of South America.

Choose *three* of these products, show by sketch maps an area in which each is important and describe the conditions which make its production profitable. (*N.*)

*26. How do you account for the fact that many of the large towns of South America and Africa are ports? (*O. and C.*)

27. State the main geographical conditions which contribute to the development of important seaports. Select *one* port in Africa and *one* in South America, and explain, with the aid of sketch maps, how the development of each of these two ports has been influenced by the conditions you have stated. (*L.*)

28. What difficulties do the Australians envisage if they abandon their White Australia Policy? On the other hand, what advantages might result? (*O. and C.*)

29. Locate in Australia by means of a large sketch map (*a*) a relatively well-populated coastal area, (*b*) a lightly populated alluvial plain, (*c*) a large area with practically no inhabitants. Give reasons for the differing densities of population in these areas. (*C.*)

30. Describe, and give reasons for, the differences in climate between Tasmania and north-east Queensland. Show how these differences are reflected in the character of the crops produced in these areas. (*O. and C.*)

31. Give an account of (*a*) the irrigation schemes of south-east Australia, and (*b*) the Great Artesian Basin, pointing out their significance in the economic life of the Commonwealth. (*O. and C.*)

32. Write an account of the mineral resources (other than coal and iron) of Australia, and draw a sketch map to show the principal mining areas and the railways and ports which serve them. (*O. and C.*)

33. Wool, wheat, and meat are the mainstays of Australian economy. Discuss. (*O.*)

34. Discuss the effect of climate on the distribution of natural vegetation and cultivated products in Western Australia. (*B.*)

35. Give reasoned explanations for the distribution of population and settlements in *either* Western Australia *or* South Island, New Zealand. (*O. and C.*)

36. Selecting *either* Australia *or* New Zealand, examine the extent to which the world position, the home market, and the supply of power and raw materials are responsible for the slow development of large-scale manufacturing industries in the country chosen. (*O. and C.*)

37. Select any two of the territories (*a*) to (*d*) inclusive and write briefly on the topics indicated after the *two* you select:—

(*a*) North Island (N.Z.)—maoris, vulcanicity;
(*b*) Tasmania—apples, minerals;
(*c*) the interior of Australia—aborigines, "flying doctors";
(*d*) New South Wales—irrigation, Sydney Harbour. (*W.*)

38. (*a*) Describe the farming activities in (i) the interior lowlands of New South Wales, (ii) the interior of the Northern Territory. Suggest reasons for the differences you note.

(*b*) Describe the ways in which the land is used in the coastal areas of the State of South Australia.

(*c*) What advantages for the development of a large-scale dairying industry are possessed by the lowlands of the North Island of New Zealand? (*N.*)

39. Draw sketch maps of (*a*) Tasmania, (*b*) North Island, New Zealand, to indicate the chief features of relief and climate. Briefly discuss the trade of Auckland and Hobart. (*O.*)

40. Describe the climates and productions of (*a*) the west coastal area of South Island, New Zealand; (*b*) Western Australia. (*O.*)

*41. Locate the principal wool producing regions of the Southern Hemisphere and give a geographical account of sheep rearing in *one* of them. (*C.*)

*42. Write a short geographical essay on one of the following topics:—

(*a*) the Sahara as a barrier across North Africa;

(*b*) the importance of motor transport in countries of backward development;

(*c*) the importance of South America's mineral production. (*N.*)

43. From the southern continents choose *two* seaports. For each of the two (*a*) describe its hinterland, (*b*) show how railways have assisted in the development of each port. (*D.*)

44. (*a*) Name *three* distinct types of natural vegetation which would be seen in crossing *either* Australia *or* South America at about the Tropic of Capricorn.

(*b*) Choose *one* of these types, describe its extent and geographical conditions which have influenced its natural plant life. (*L.*)

45. Locate on sketch maps the areas of tropical grassland in (*a*) Australia, (*b*) Africa. Describe the economic importance of *either* the Australian *or* African area you have mapped and state the factors which have influenced its development. (*O. and C.*)

*46. How do you account for the fact that many of the large towns of South America and Africa are ports? (*O. and C.*)

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